PHASE MECHANICAL PROJECTS

CONTRACT NAME AND No: EMG Plot 9 2110

DR No: N/A	Our Reference: PMP-2110-TDS-010
Recipients: Lyndon Hart, Darren Johnston, Robert Stevenson	
Organisation: Winvic	
Information Supplied: Technical Submission of BMS	
Documents Attached: Manufacturer literature Data Sheets Drawings	**Version: -$**
Date: 06/10/2021 **Response By: 16/10/2021** **Status: For Comment**	

Received by: Date and Time: For Winvic	Returned by: Date and Time: Engineer/Architect/Client's Representative

CC: ☐ Site File ☐ Site QS

AirTech Controls Ltd

BMS Technical Submission

For The Automatic Control

System At

Segro Plot 9 Logistics Park East Midlands Gateway

Project Number: P2110502

AirTech Controls Ltd

Projects, Maintenance & Energy Solutions

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PHASE MECHANICAL PROJECTS

Contents

1. Description of Operation

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Segro Plot 9 Logistics Park East Midlands Gateway

BMS Description Of Operation

Main Offices

Introduction

The plant room located on the 2nd floor will house the mechanical plant to provide the Heating, Ventilation, Air Conditioning & DHWS to the warehouse Main Office. A single boiler will provide heating to radiators located in toilets, tea points and stair wells. A solar heating system will provide the main source of Domestic Hot Water with the heating boiler to assist. A packaged AHU will deliver tempered air to a VRF system which provides the primary heating and cooling within the office areas.

A Mechanical Control Panel will be installed in the plant room and will provide the power and/or control the following items of mechanical plant: -

The following items are powered / controlled from the new panel: -

1 -	Main Office Plantroom Gas Solenoid Valve	
1 -	Heating Pressurisation Unit	
2 -	Constant Temperature Heating Pumps No1 & No2	Duty / Standby
1 -	Boiler	
2 -	VT Heating Pumps No1 & No2	Duty / Standby
1 -	DHWS Solar Heating Calorifier c/w Immersion Heater	
1 -	DHWS Calorifier De-Stratification Pump	
1 -	DHWS Secondary Return Pump	
1 -	Packaged AHU (enable & monitoring only)	
1 -	Twin Toilet Extract Fan	
1 -	Rainwater Harvesting System (monitoring only)	

The listed mechanical items above are provided with Hand / Off / Auto selector switches on the control panel fascia along with Enabled / Run and Fault / Trip lamps. In the Hand position, the plant is permanently enabled providing the necessary safety interlocks are healthy. In the Auto position they are enabled by the Trend BMS where adjustments and overrides can be made from the password protected IQView8 keypad on the control panel fascia.

Fire Alarm

The control panel is interlocked with the following devices: -

- Building Fire Alarm → Disables all plant controlled from the mechanical control panel.

Once the respective fire alarm has been reset, the plant will be re-enabled automatically.

Gas Safety Circuit

The plant room has the following safety devices: -

- Emergency Stop Button
- Boiler Thermal Link

Should either of the above devices activate, all plant controlled from the mechanical panel will be disabled. All other pump sets will remain operational. Once the issue has been resolved and the respective device reset, the Reset button on the control panel fascia will also need to be pressed. Once pressed, the plant will return to its original state.

Heating Pumps

Pumps will operate on demand providing the pressurisation unit is in a healthy state. Each pump is monitored for its running status. If the duty pump is enabled but the BMS does not detect the running status after 30 seconds, the BMS will assume there is a failure and will enable the standby pump. An alarm will be sent to the supervisor stating there is a pump failure; this failure will require a physical inspection of the pump. Once the issue is resolved, a manual reset will need to be made via the keypad or the failure will try and reset automatically at midnight each day. Similarly, if the BMS is not enabling the pump but the pump is running, an alarm will also be raised as the pump may have been switched to the 'hand' position on the control panel or in manual mode on the pump.

Pumps will change over on a weekly basis at an adjustable date and time to gain equal use out of each pump.

Heating

The boiler is interlocked with the Constant Temperature (CT) Heating Pumps. Once operating, the boiler will distribute heating to a Variable Temperature (VT) radiator circuit, AHU Heating Coils and will also assist the Solar Heating System to provide heating to the Domestic Hot Water Calorifier.

Variable Temperature

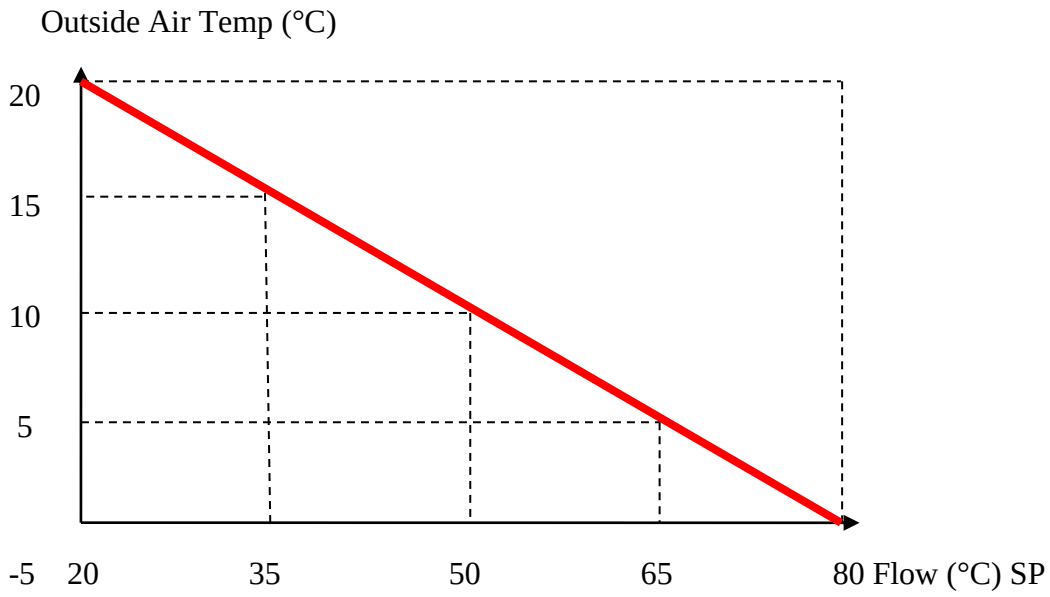
The variable temperature radiator circuit is complete with a 3 port control valve and a heating flow temperature sensor and will provide heat to radiators located in toilets, tea points and stairwells. This will operate under the hours of the occupancy time schedule for the building.

This time schedule is optimised, determined by the outside air and room temperature sensors, meaning that the radiators may be enabled along with the VRF up to 3 hours (adjustable) before the actual start times in order for the space temperature to reach setpoint of 21°C (adjustable) before the occupancy.

The calculated set point to the radiators determined by the outside air and space temperature sensors located in the areas.

The following shows the typical slope on how the temperature control is applied.

-5˚C Outside = 80˚C Flow Temperature
10˚C Outside = 50˚C Flow Temperature
20˚C Outside = 20˚C Flow Temperature



The maximum and minimum flow temperatures can be adjusted by end users.

Domestic Hot Water Services

Domestic Hot Water is generated from a solar heating system and stored in a calorifier. If the solar heating system doesn't maintain the secondary flow setpoint of 60˚C, the primary heating system will assist by controlling a 3 port control valve. A high limit thermostat (set at 70˚C) is fitted on the secondary flow of the calorifier together with a 2 port valve fitted to the heating primary flow to the calorifer. Should the stat operate, both the 3 port control valve and the 2 port valve will close.

Should there be a heating failure and there is still a requirement for domestic hot water, an electric immersion heater has been provided within the calorifier. This can be enabled via a switch on the control panel for use in an emergency situation.

Ventilation

Ventilation is provided by a packaged Air Handling Unit (AHU). This unit will operate via its own control system to supply tempered fresh air to the primary side of the VRF units in the office areas. The BMS enables the unit, monitors it for its running & fault statuses and also monitors the temperature of the air being supplied.

Temperature changes to the VRF system can be made via the Mitsubishi AE200 controller located on the control panel fascia.

Boiler Control

The boiler set point will change based on demand. If there is a demand for heating to the radiators and the AHU/DHWS circuit the set point will be 80°C. If there is demand from the DHWS alone, the set point will be 65°C. During optimised start up, the set point will be 80°C.

Toilet Extract

A twin extract fan has been provided for the toilet areas. This comes complete with an automatic changeover panel which will change the duty and standby fans over on a weekly basis and fan failure. The BMS will enable the unit and monitor it for its running & fault statuses.

Frost Protection & Hold Off

Heating Plant

Outside of the occupied hours the items of plant are enabled if the following instances occur: -

- The outside air temperature drops below 2°C (adjustable). All pumps are enabled to circulate water until the outside air temperature rises above 5°C.

- The common boiler return temperature sensor drops below 8°C (adjustable). The boiler system will be enabled until the return temperature rises above 35°C.

If external temperatures rise to and above 18°C, the following will occur: -

- VT Heating pumps & the 3 port control valve will be disabled until the temperature falls below 17°C.

Rainwater Harvesting System

The BMS monitors the Rainwater Harvesting system for a fault condition. The Rainwater usage and the Mains Cold Water top up are also monitored by the BMS. The BMS shall mimic the m3 value on each meter

Metering

The BMS monitors a number of meters as follows: -

Gas Meters - The BMS shall mimic the m3 value on each meter

Boundary Gas Meter
Boiler Gas Meter

Water Meters- The BMS shall mimic the m3 value on each meter

Boundary Water Meter
Building Incoming Water Meter
DHWS Mains Cold Water Meter
Gate House Water Meter

Electric Meters- The BMS shall mimic the kWh value on each meter

MSB Main Incoming Electric Meter	1 meter
Circuit out to DB-GH Electric Meter	1 meter
Circuit out to DB-MECH Electric Meter	1 meter
Circuit out to Dock Door Bus Bar 1 Electric Meter	1 meter
Circuit out to Dock Door Bus Bar 2 Electric Meter	1 meters
Lift Electric Meter	1 meters
PV-G99 Panel Board 01Electric Meter	1 meters
DB-EX-LP Dist. Board Electric Meter	2 meters
DB-MO-LP Dist. Board Electric Meter	2 meters

Water Leak Detection

WM1 & WM2 are expected to have the same usage at all times.

In the event that a difference appears between the boundary cold water meter WM1 and WM2 Cold Water Meter of more than 200 litres (BMS user adjustable set point), an Audible and visual alarm will be raised at the Control Panel Fascia via a dedicated lamp and audible sounder, this sounder also has a mute push button. This alarm will also be displayed on the control panel fascia mounted keypad.

In the event that a reading is being received from the main incoming boundary water meter WM1 but no reading is being received at WM2 Building Main Incoming Water Meter for a period of 10 minutes (BMS adjustable), an Audible and visual alarm will be raised at the Control Panel Fascia via the dedicated lamp and audible sounder, this sounder also has a mute push button. This alarm will also be displayed on the control panel fascia mounted touch screen.

Leakage Rate - High

Over a 60-minute period (adjustable) the flow of water through WM1, WM2, WM3 & *WM4 is monitored and compared against a continuous high flow rate set point of 300 l/Hr (adjustable). Therefore, if more than 300 litres are measured through any of the three meters during a 1-hour period a continuous high leak alarm is raised at the Control Panel Fascia via the dedicated lamp and audible sounder, this sounder also has a mute push button. This alarm will also be displayed on the control panel fascia mounted touch screen.

Leakage Rate - Low

Over a 60-minute period (adjustable) the flow of water through WM1, WM2, WM3 & *WM4 is monitored and compared against a continuous low flow rate set point of 100 l/Hr (adjustable). Therefore, if more than 100 litres are measured through any of the three meters during a 1-hour period a continuous low leak alarm is raised at the Control Panel Fascia via the dedicated lamp and audible sounder, this sounder also has a mute push button. This alarm will also be displayed on the control panel fascia mounted touch screen.

Leakage Rate – Continuous

If either the low or high leakage rate alarm is triggered for more than 2 hours (adjustable) a continuous leak alarm is raised at the Control Panel Fascia via the dedicated lamp and audible sounder, this sounder also has a mute push button. This alarm will also be displayed on the control panel fascia mounted touch screen.

Energy Usage Targets

Each meter will have a max daily usage values (adjustable), at commissioning stage this value will be an estimate. The true value will need to be determined during seasonal commissioning (if instructed to do so). Once the building is being used a sensible alarm value can be decided upon. This alarm value will be easily accessible to adjust by the end user.

Common Alarm

Should an alarm be detected from the mechanical plant, a lamp and sounder in reception will be activated. The sounder can be muted before investigating the fault, the lamp will stay illuminated. If the failure cannot be reset and another fault occurs, the sounder will be re-enabled to alert staff.

Hub Office

Introduction

A mechanical control panel will control the ventilation to the Hub Office. There is a Heat Recovery Unit and Toilet Extract Fan on the Ground and First Floors.

Fire Alarm

The control panel is interlocked with the following devices: -

- Building Fire Alarm → Disables all plant controlled from the mechanical control panel.

Once the respective fire alarm has been reset, the plant will be re-enabled automatically.

Emergency Stop Button

An emergency stop button has been fitted to the control panel fascia. Once pushed will shut down all plant controlled from the panel. A twist of the button is required to reset. Once reset the plant will operate as normal.

Ground Floor

The Ground Floor office will have a dedicated time schedule. During the hours of this time schedule the Heat Recovery Unit will be enabled. Temperature and fan adjustments can be made by the local controller. The BMS monitors the unit for its running and fault statuses.

The Single Unit (One Fan) Toilet Extract Fan will also be enabled during the time schedule. The BMS monitors the unit for its running status.

First Floor

The First Floor office will have a dedicated time schedule. During the hours of this time schedule the Heat Recovery Unit will be enabled. Temperature and fan adjustments can be made by the local controller. The BMS monitors the unit for its running and fault statuses.

The Single Unit (One Fan) Toilet Extract Fan will also be enabled during the time schedule. The BMS monitors the unit for its running status.

Metering

The BMS monitors a number of meters as follows: -

Water Meters - The BMS shall mimic the m3 value on each meter

Hub Incoming Water Meter

Electric Meters - The BMS shall mimic the kWh value on each meter

DB-PO-LP Dist. Board Electric Meter 2 meters

2. Control Panel Wiring Diagrams

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PROJECT SITE:

PLOT 9 EMG - EAST MIDLANDS GATEWAY

PROJECT REFERENCE:

P2110502

PROJECT TITLE:

MAIN OFFICE HEATING, DHWS & VENTILATION MECHANICAL CONTROL PANEL

CLIENT / CUSTOMER:

PHASE MECHANICAL PROJECTS

ISSUE	REVISION	DATE	COMMENTS	ENGINEER
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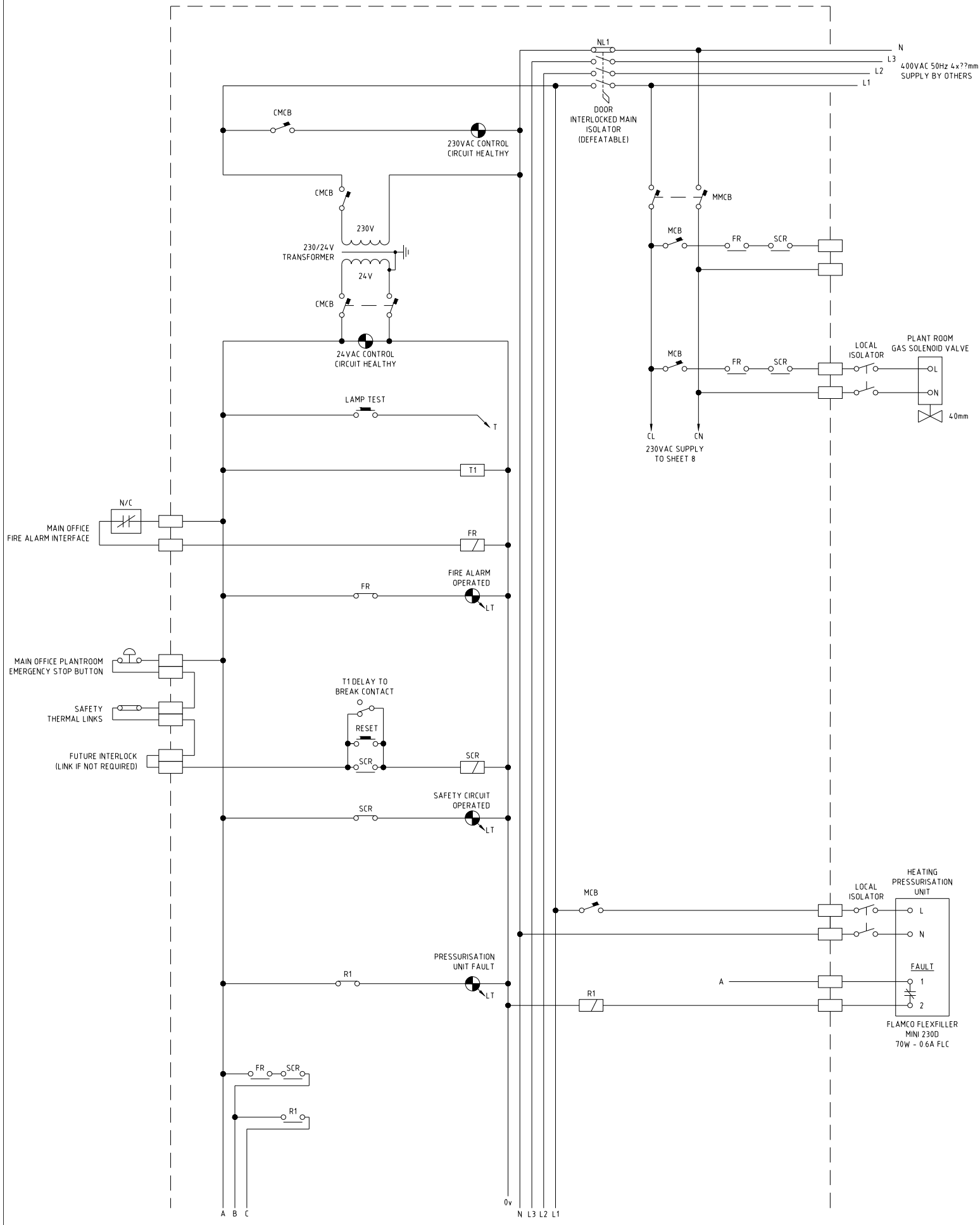

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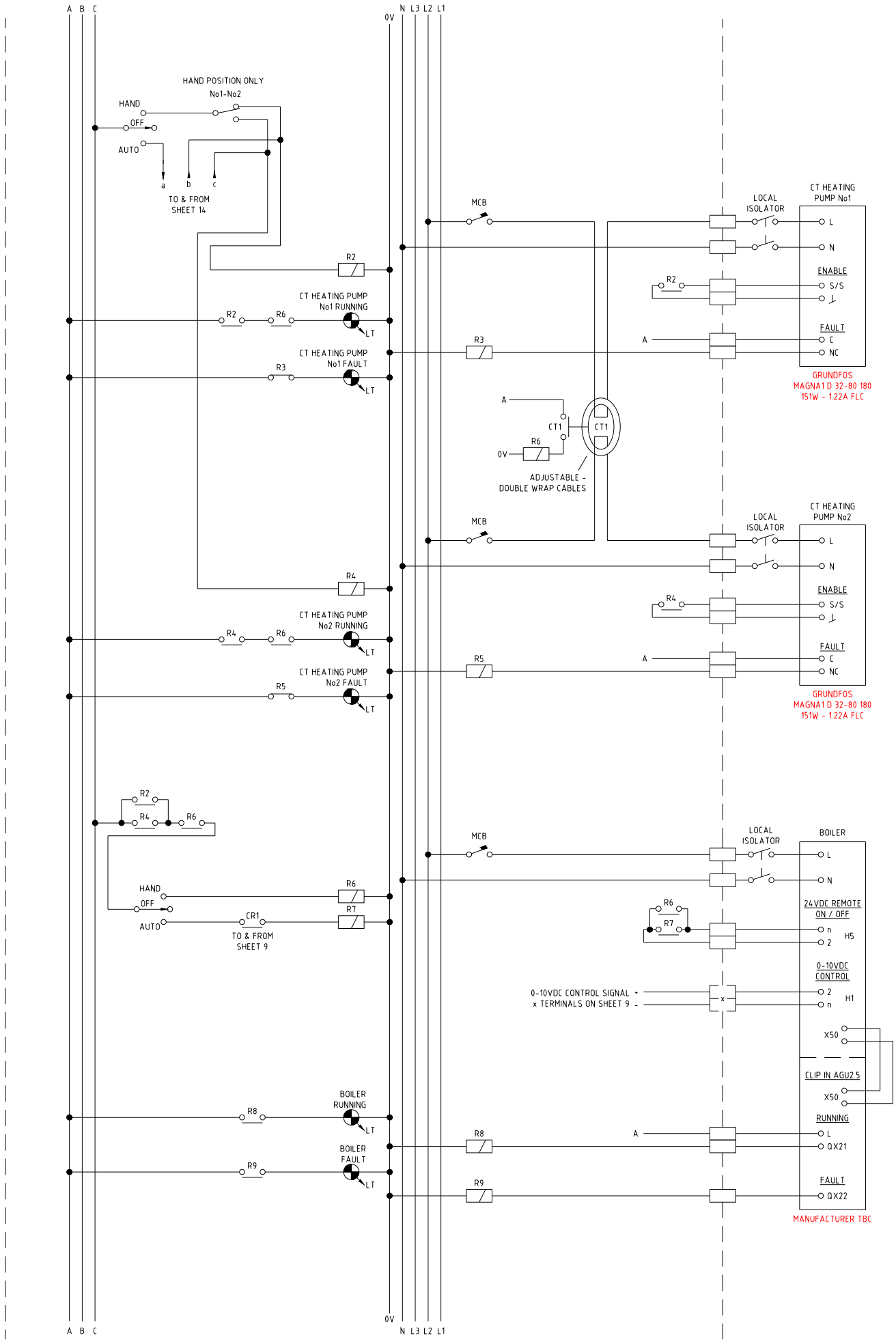

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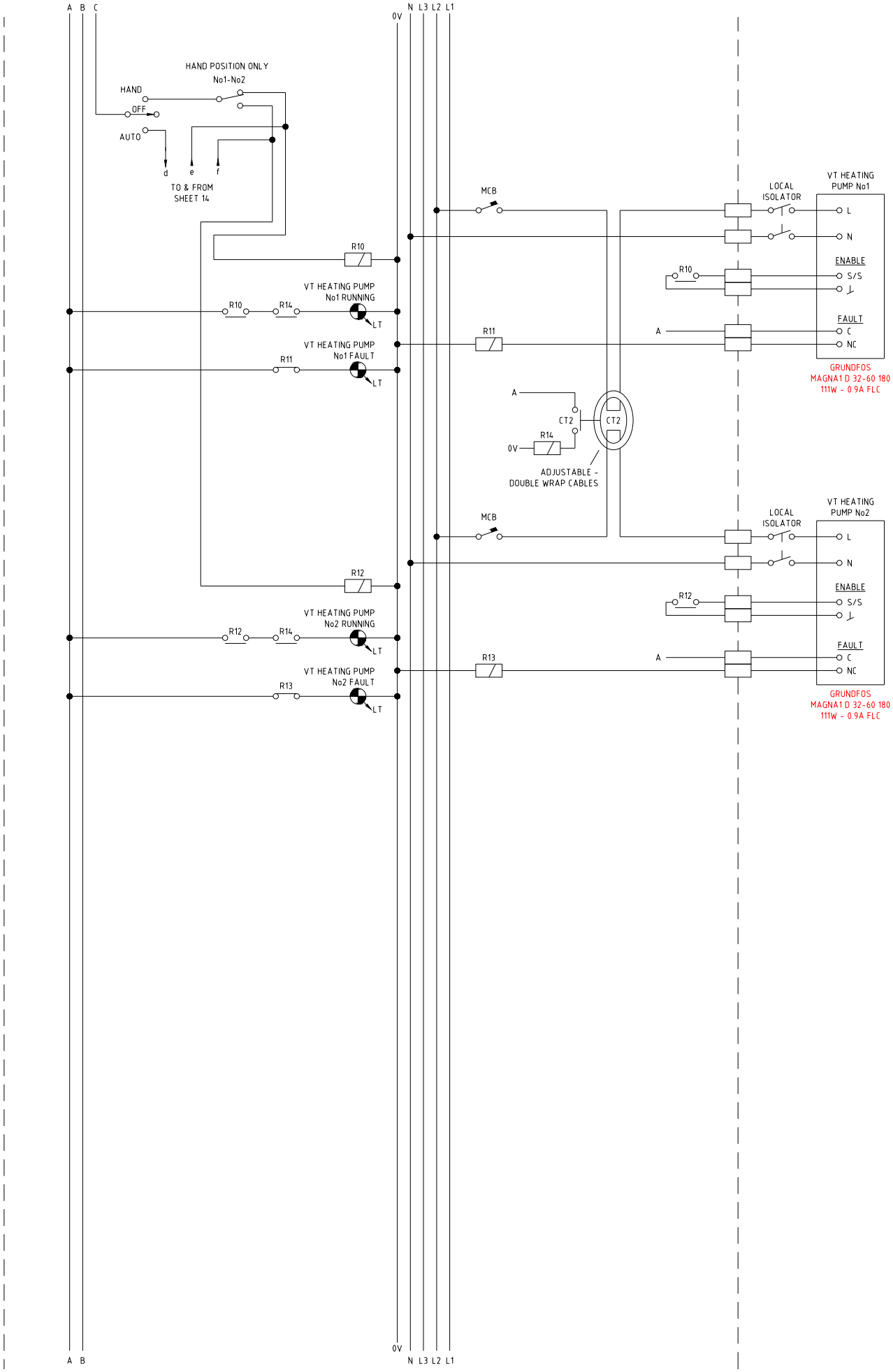

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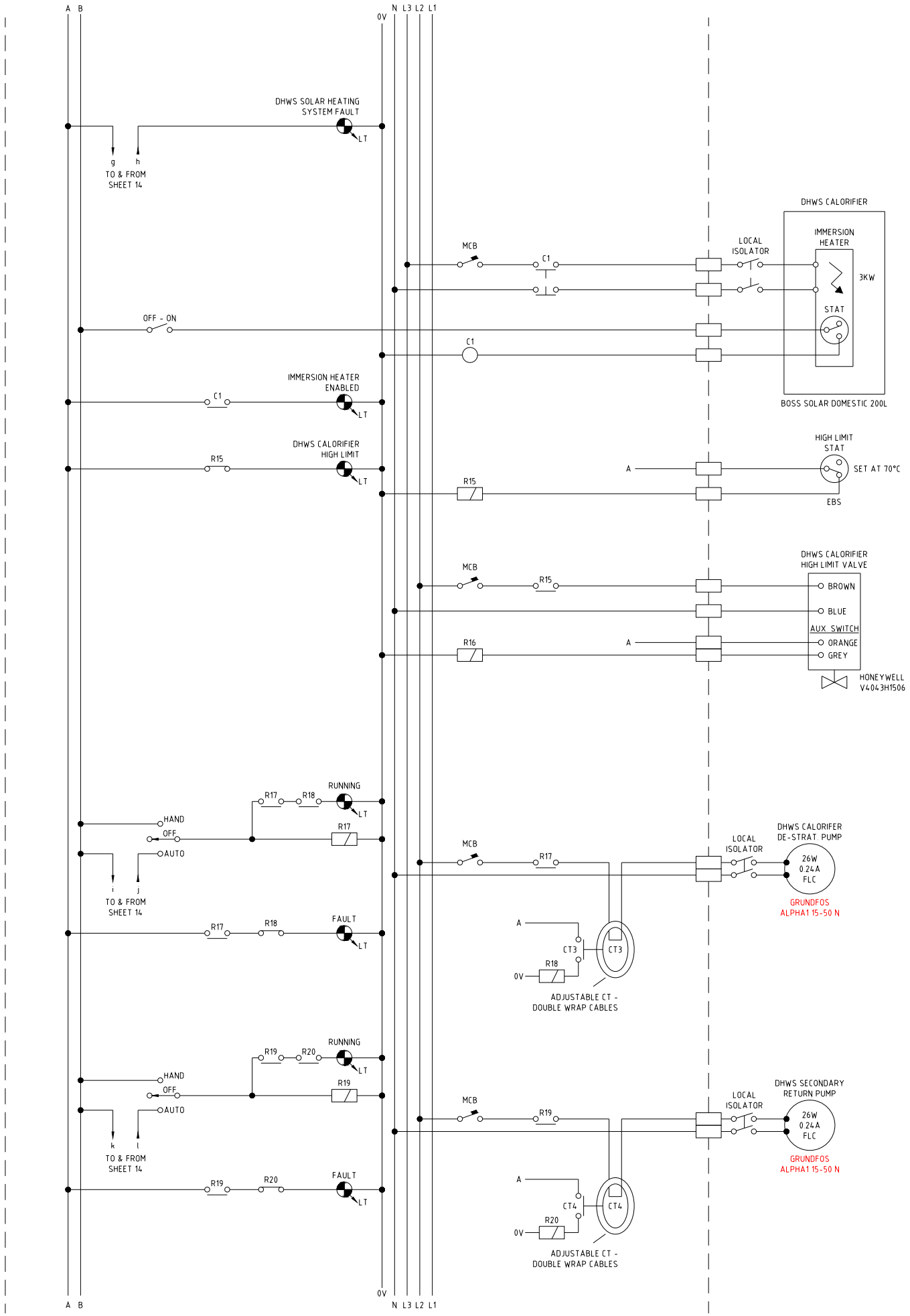

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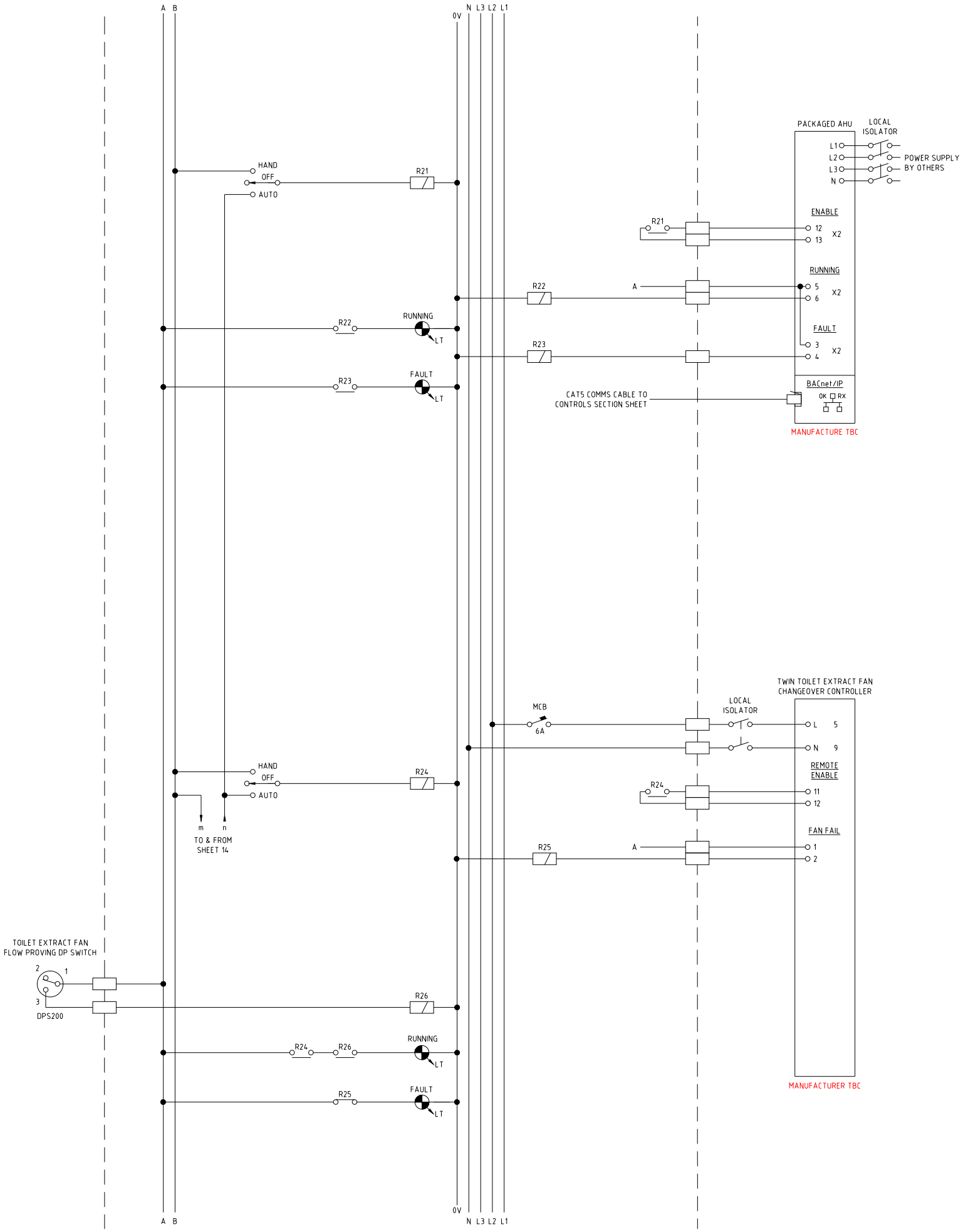

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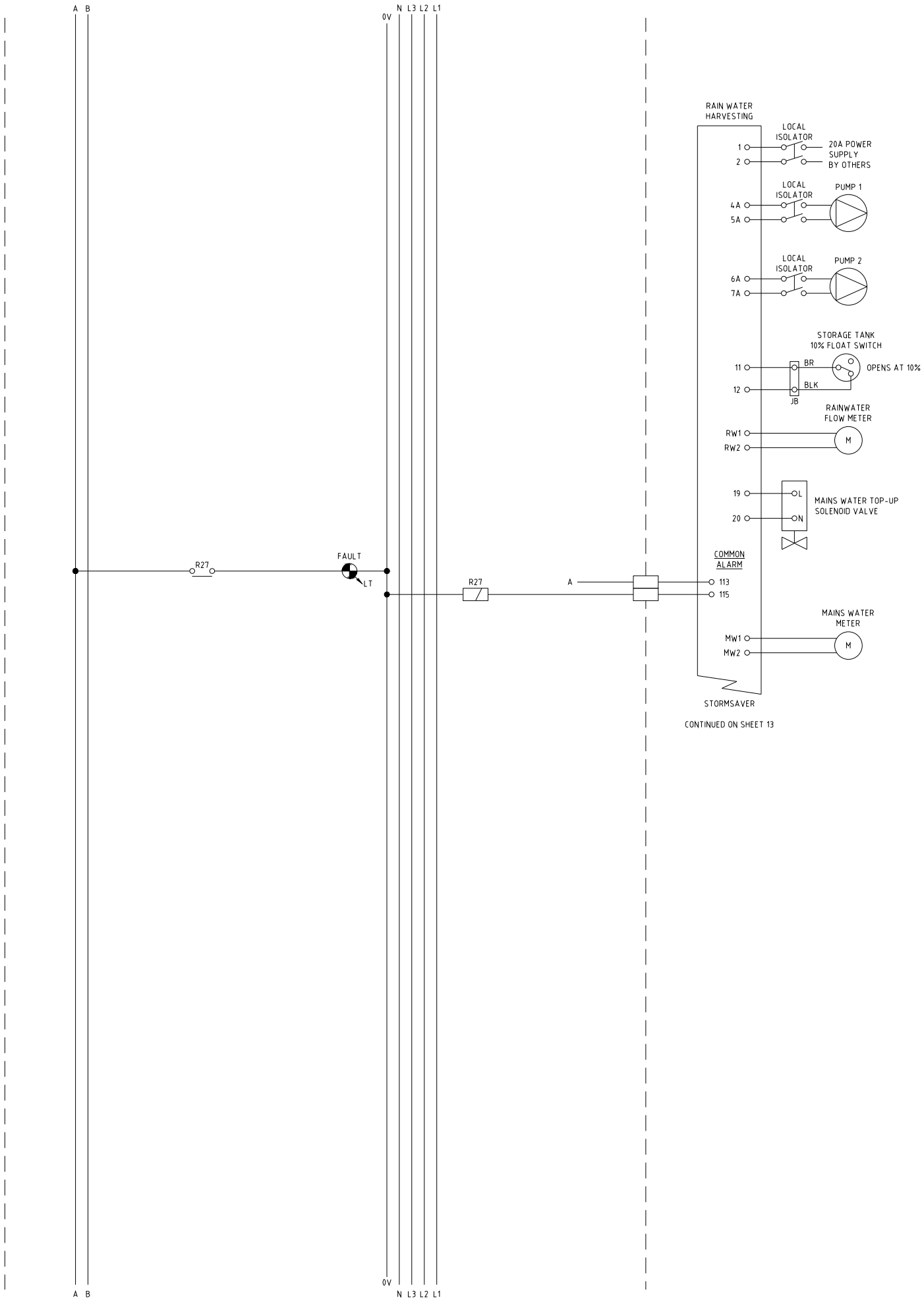

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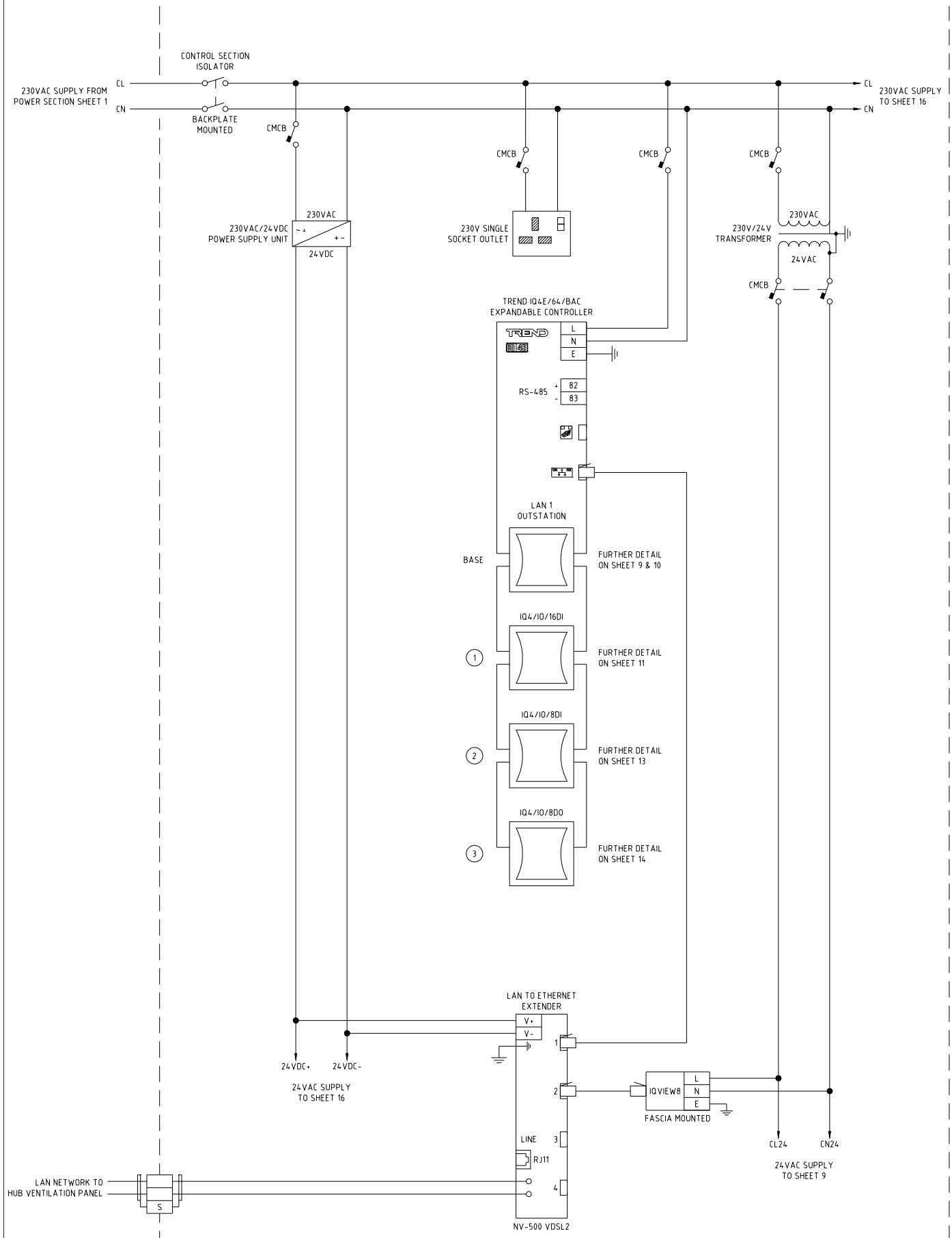

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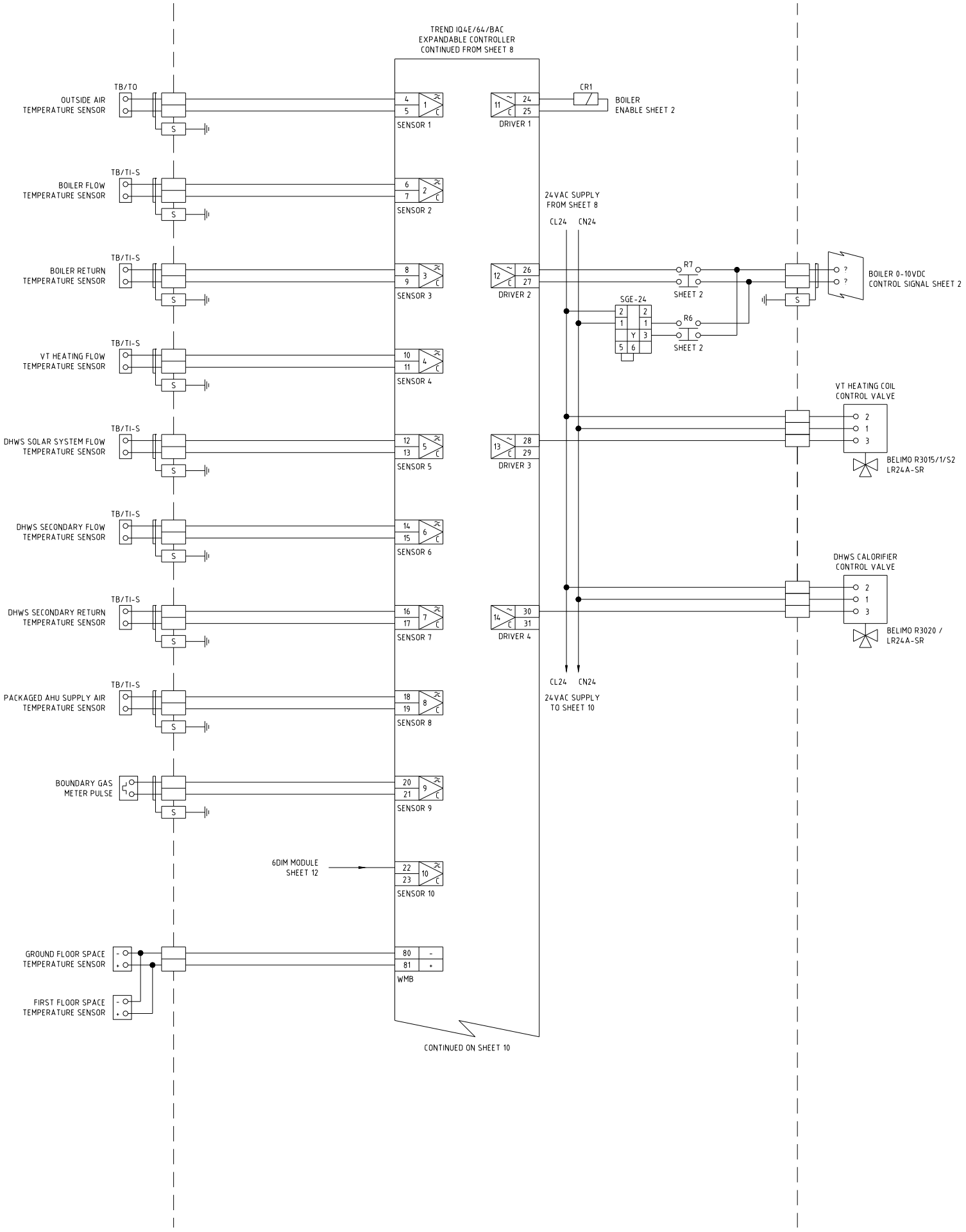

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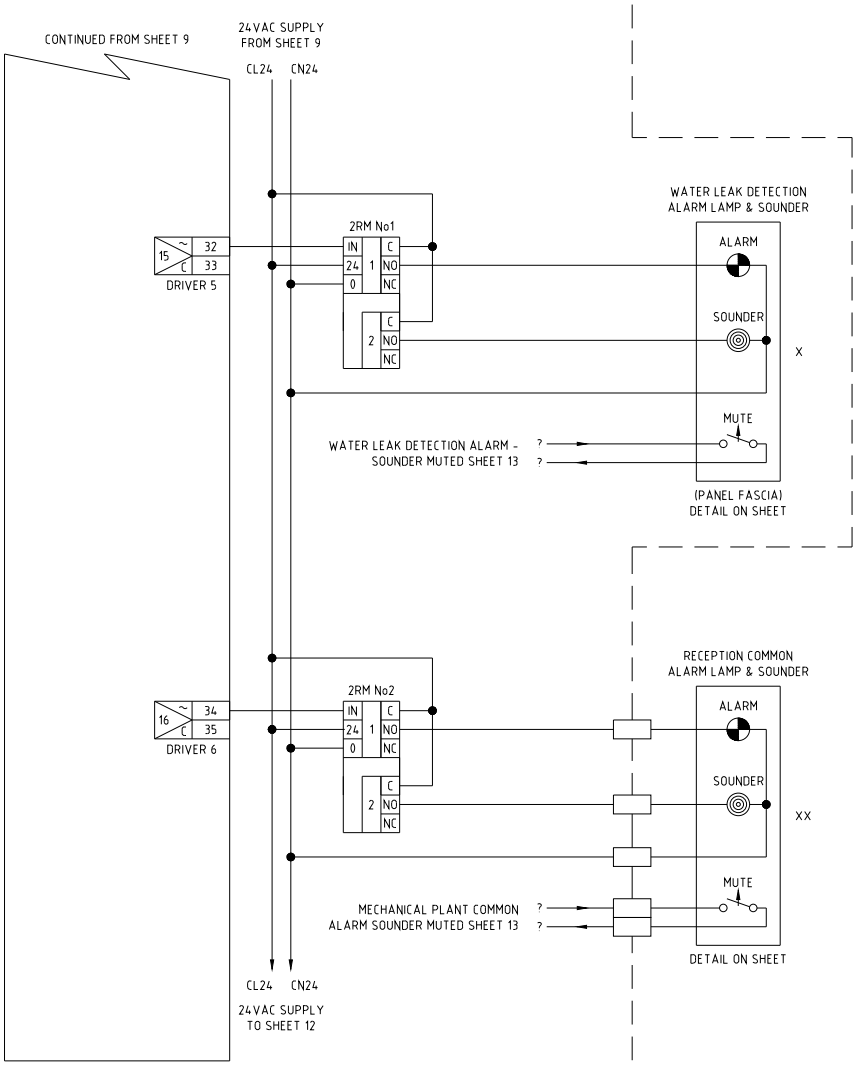

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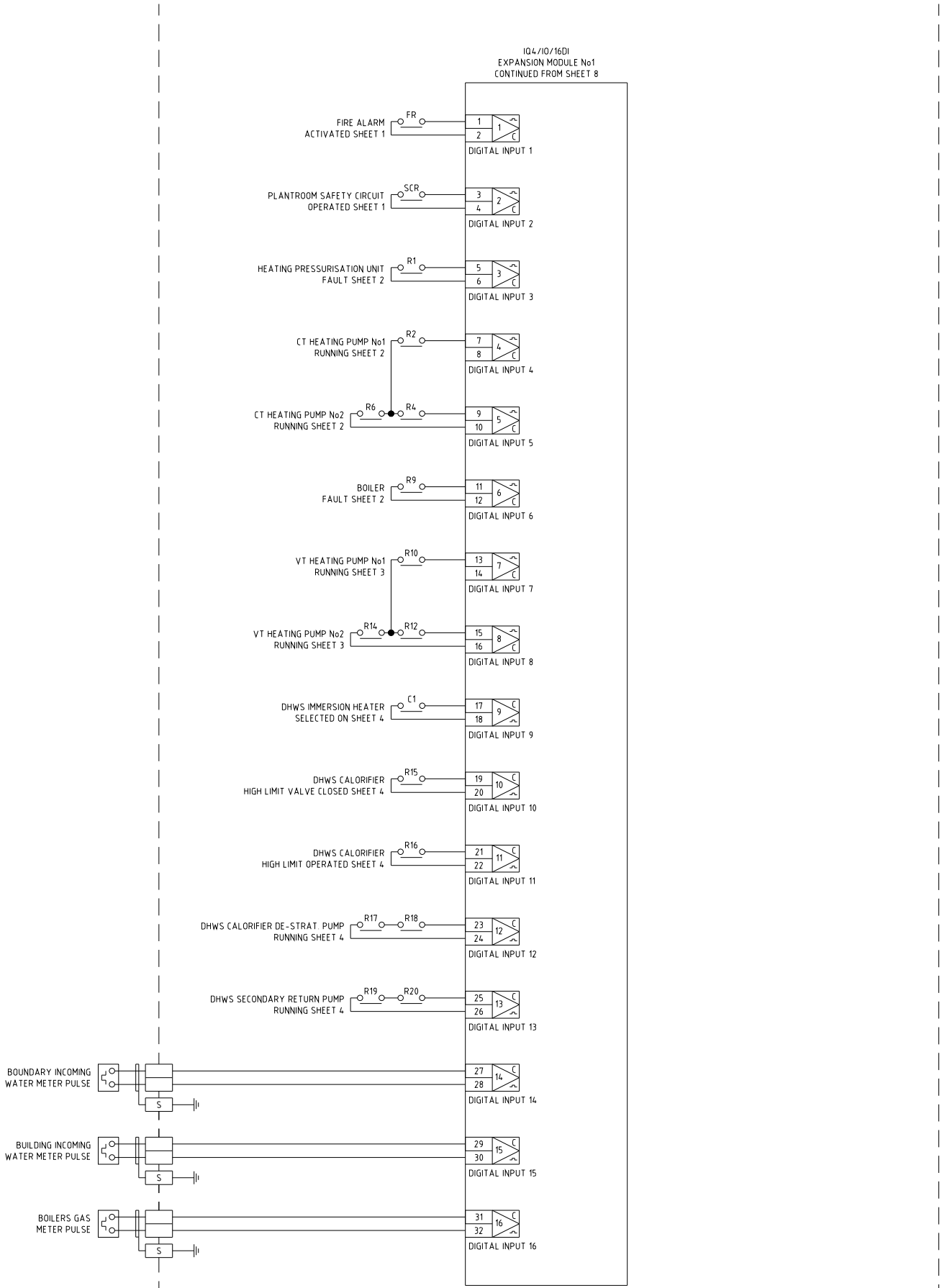

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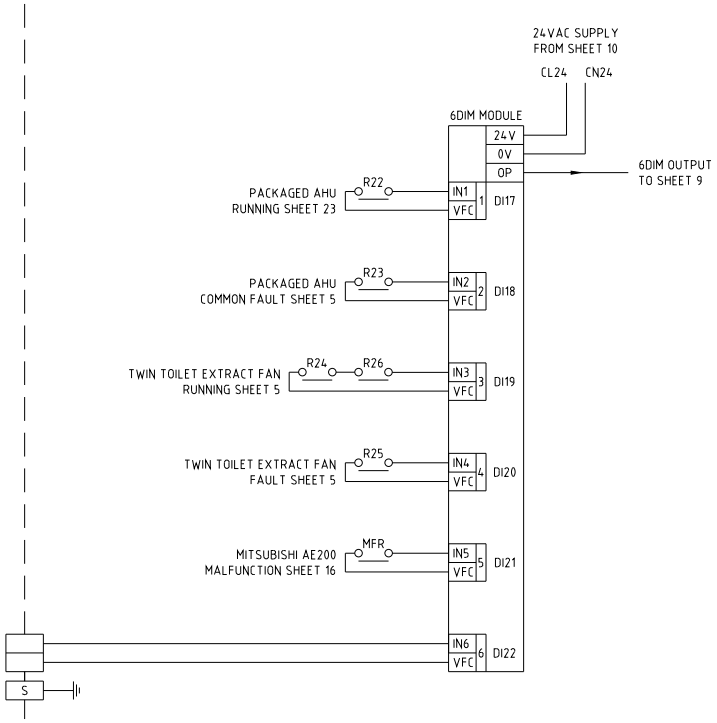

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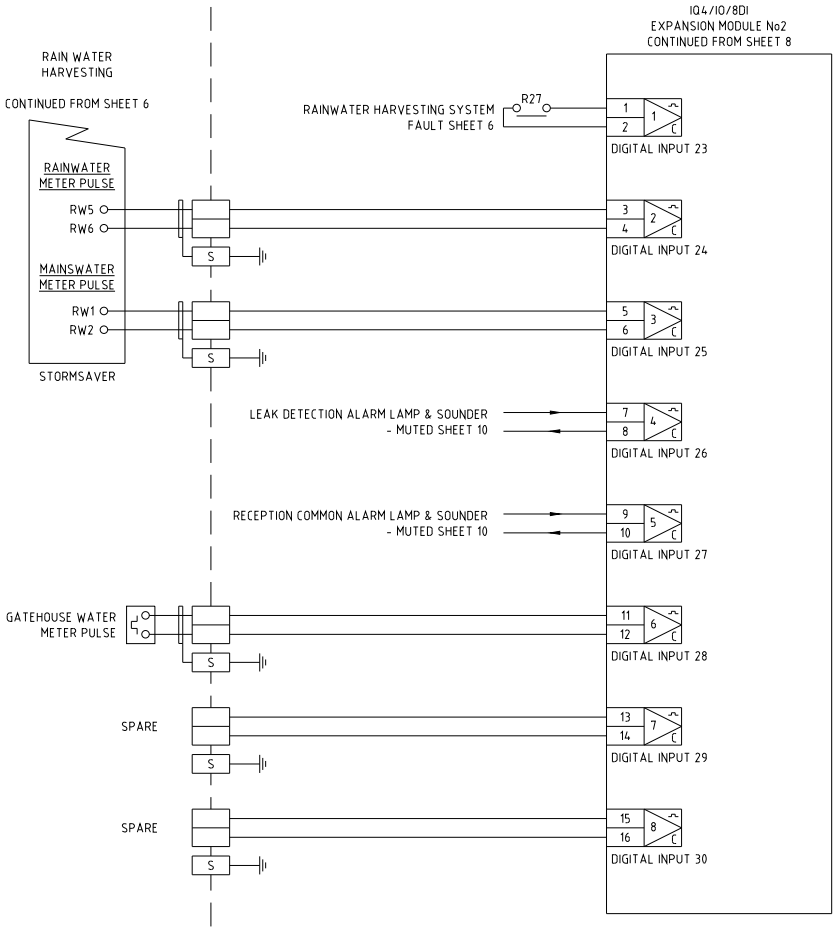

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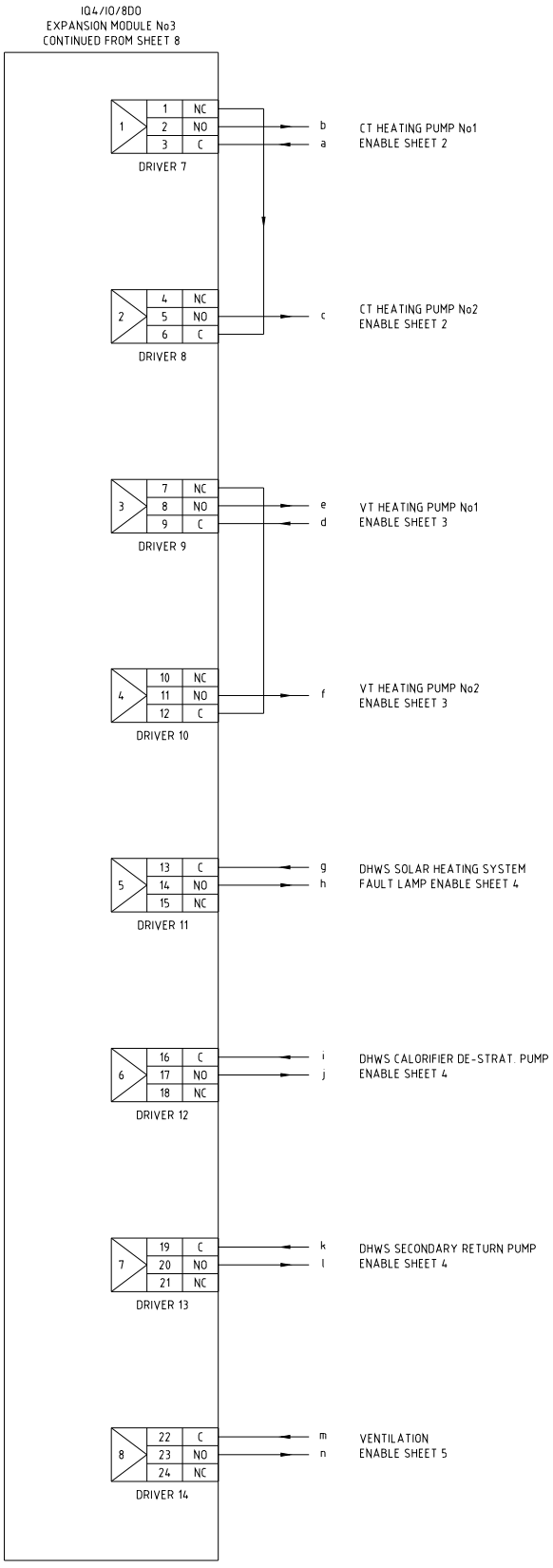

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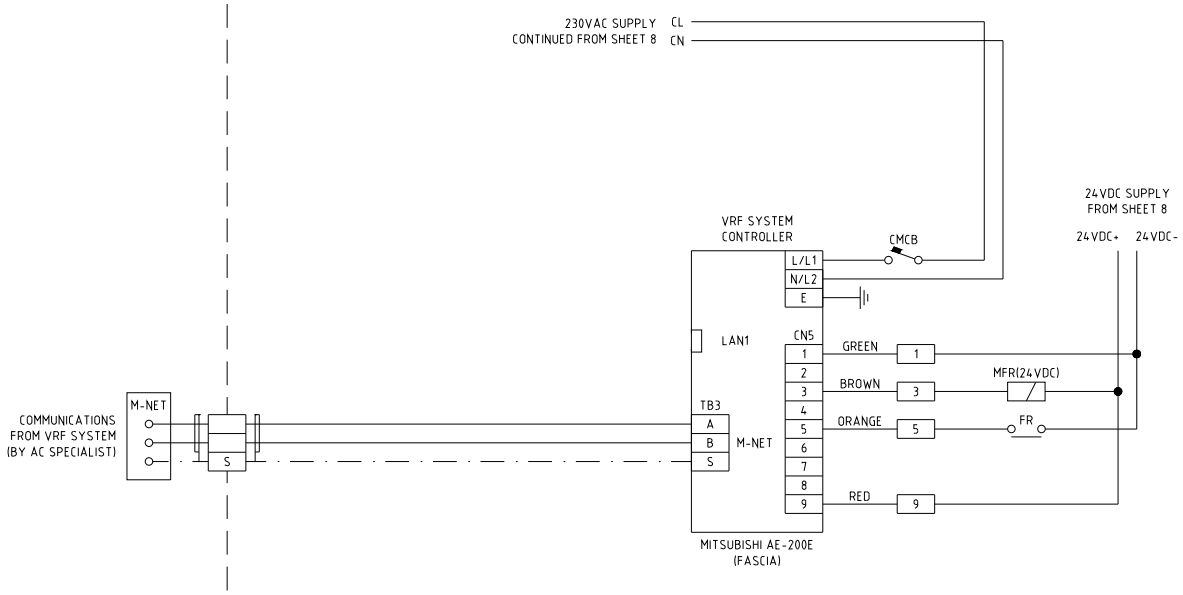

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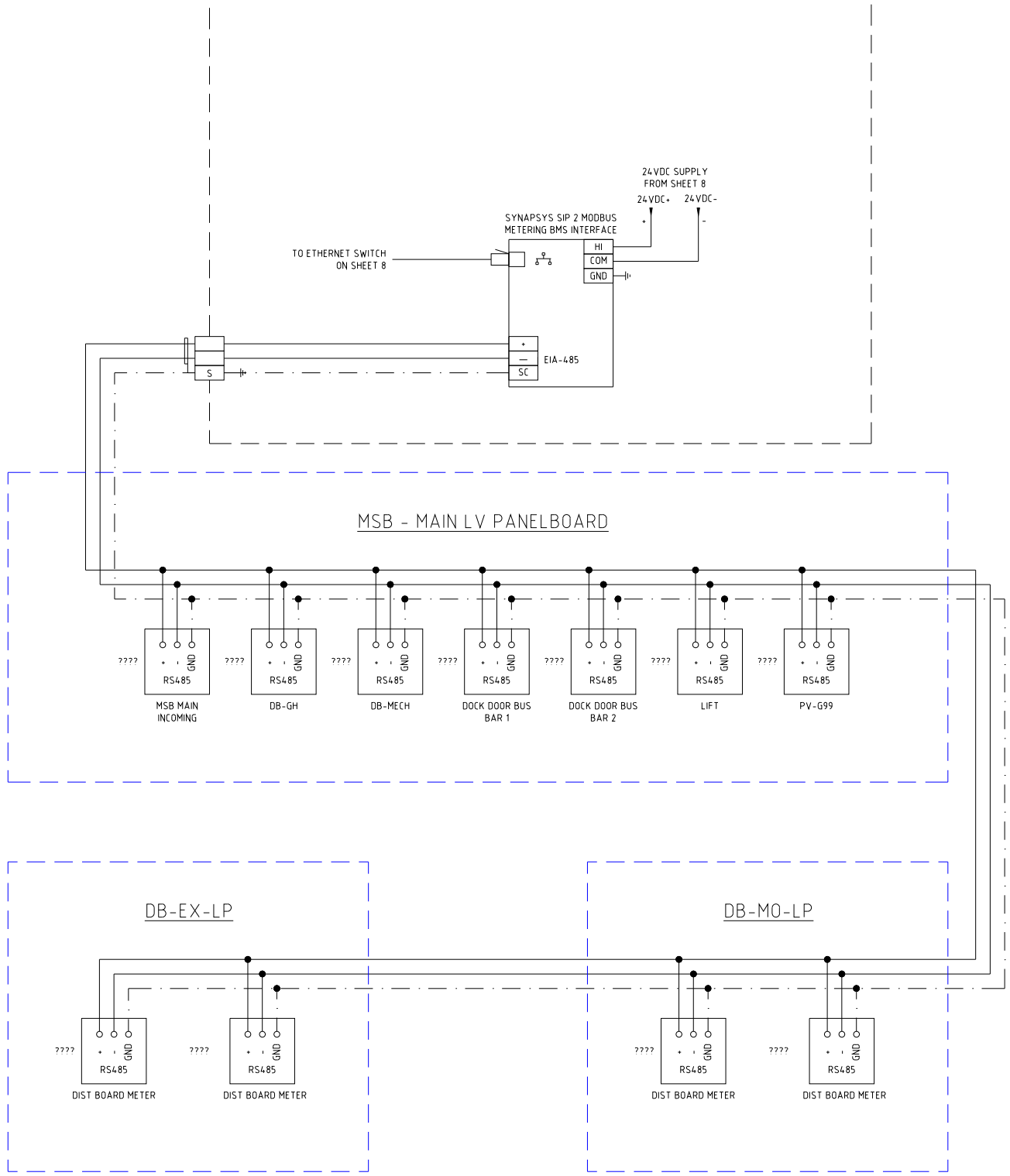
SITE : PLOT 9 EMG - EAST MIDLANDS GATEWAY	CLIENT : PHASE MECHANICAL PROJECTS	
	ENGINEER : SP	
	PROJECT No : P2110502	
	DRG. STATUS : FOR APPROVAL	
TITLE : MAIN OFFICE HEATING, DHWS & VENTILATION MECHANICAL CONTROL PANEL	DRG. No :	ISSUE : A
	PAGE : 16 OF 18	



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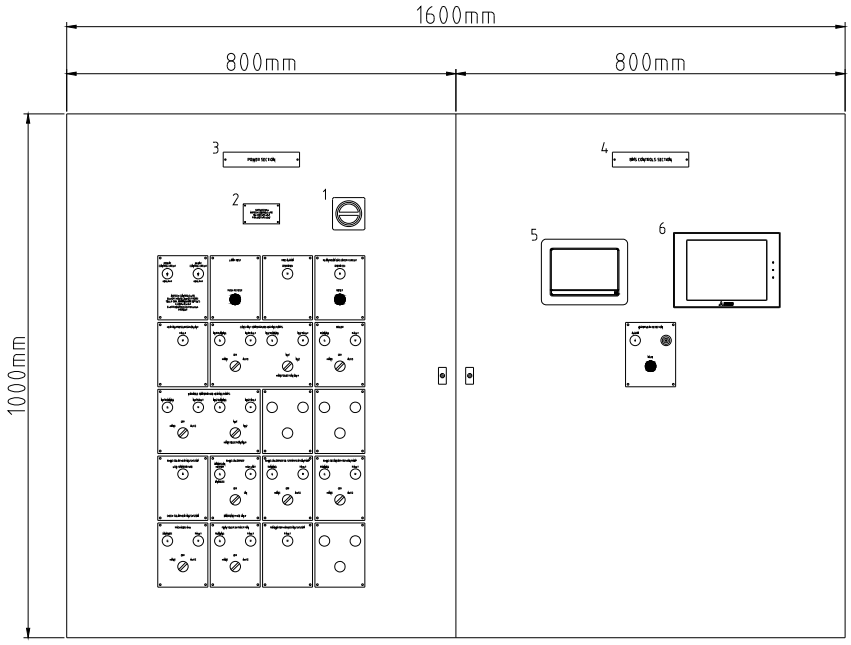
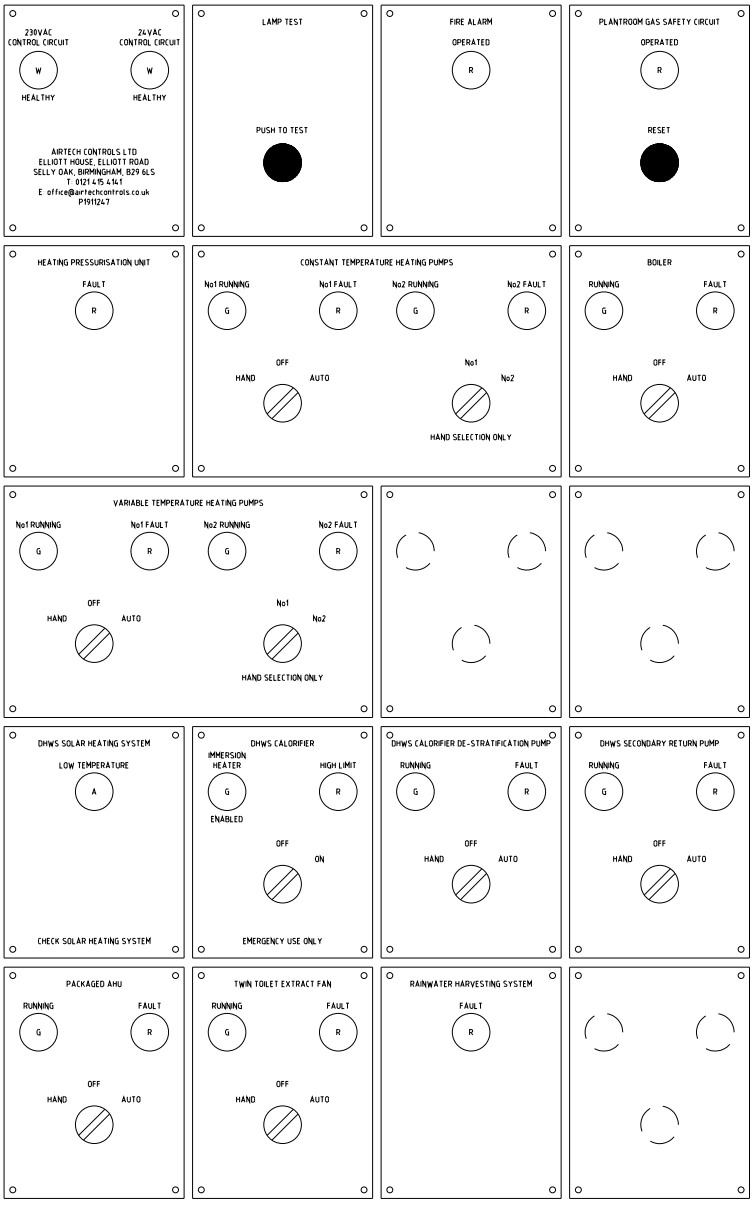
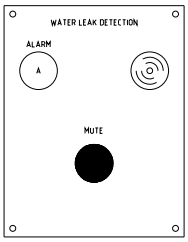
	PAGE : 17 OF 18	



DEPTH:- 300mm

1) CONTROL PANEL ISOLATOR
2) AIRTECH CONTROLS LABEL
3) POWER SECTION LABEL
4) BMS CONTROLS SECTION LABEL
5) TREND IQVIEW8 KEYPAD
6) MITSUBISHI AE-200 KEYPAD





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Projects, Maintenance & Energy Solutions

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Tel : 0121 415 4141 - Email: office@airtechcontrols.co.uk

PROJECT SITE:

PLOT 9 EMG - EAST MIDLANDS GATEWAY

PROJECT REFERENCE:

P2110502

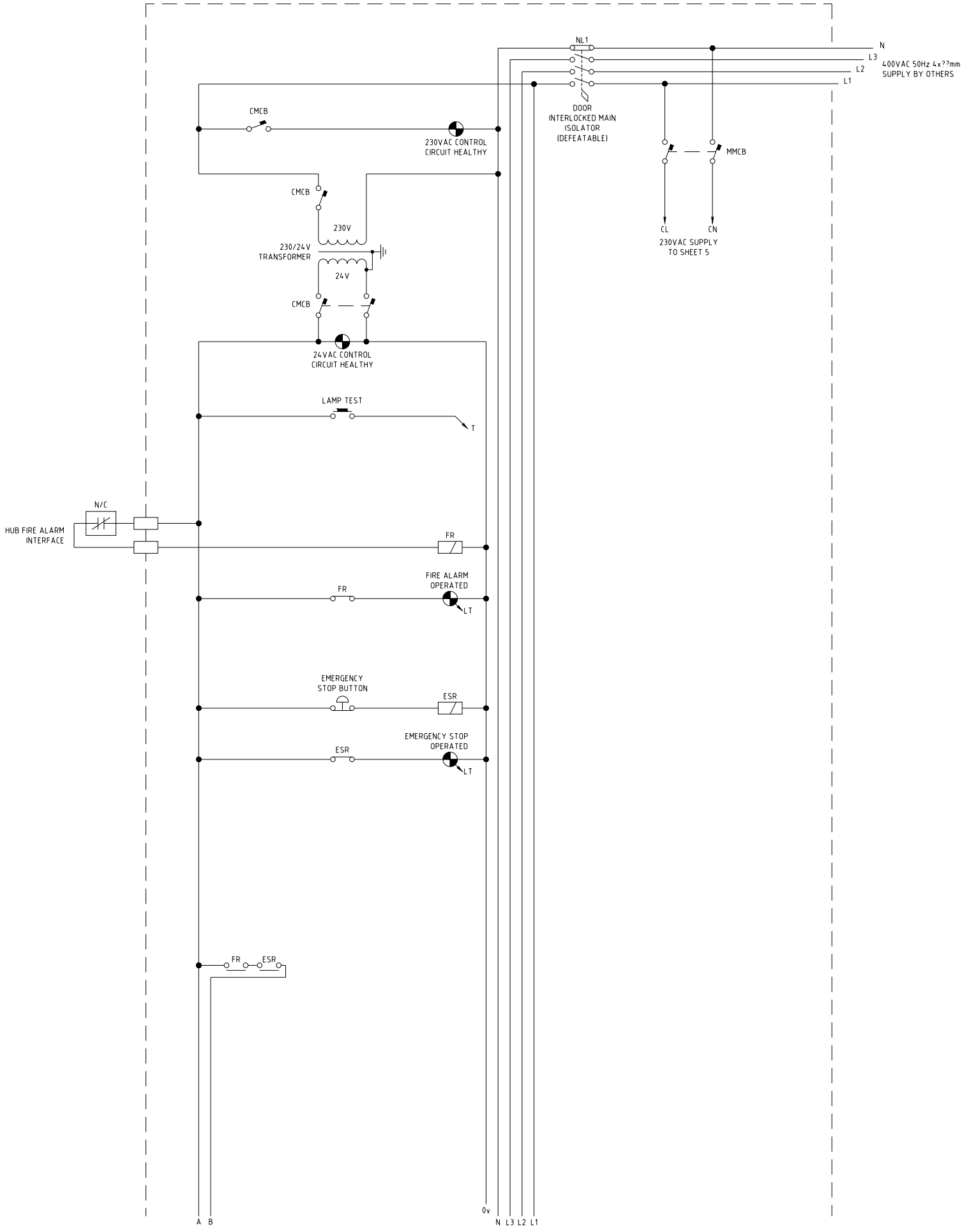
PROJECT TITLE:

HUB VENTILATION
MECHANICAL CONTROL PANEL

CLIENT / CUSTOMER:

PHASE MECHANICAL SERVICES

ISSUE	REVISION	DATE	COMMENTS	ENGINEER
A		NOVEMBER 2019	FOR APPROVAL	STEVE PAYNE



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SITE : PLOT 9 EMG - EAST MIDLANDS GATEWAY	CLIENT : PHASE MECHANICAL PROJECTS	
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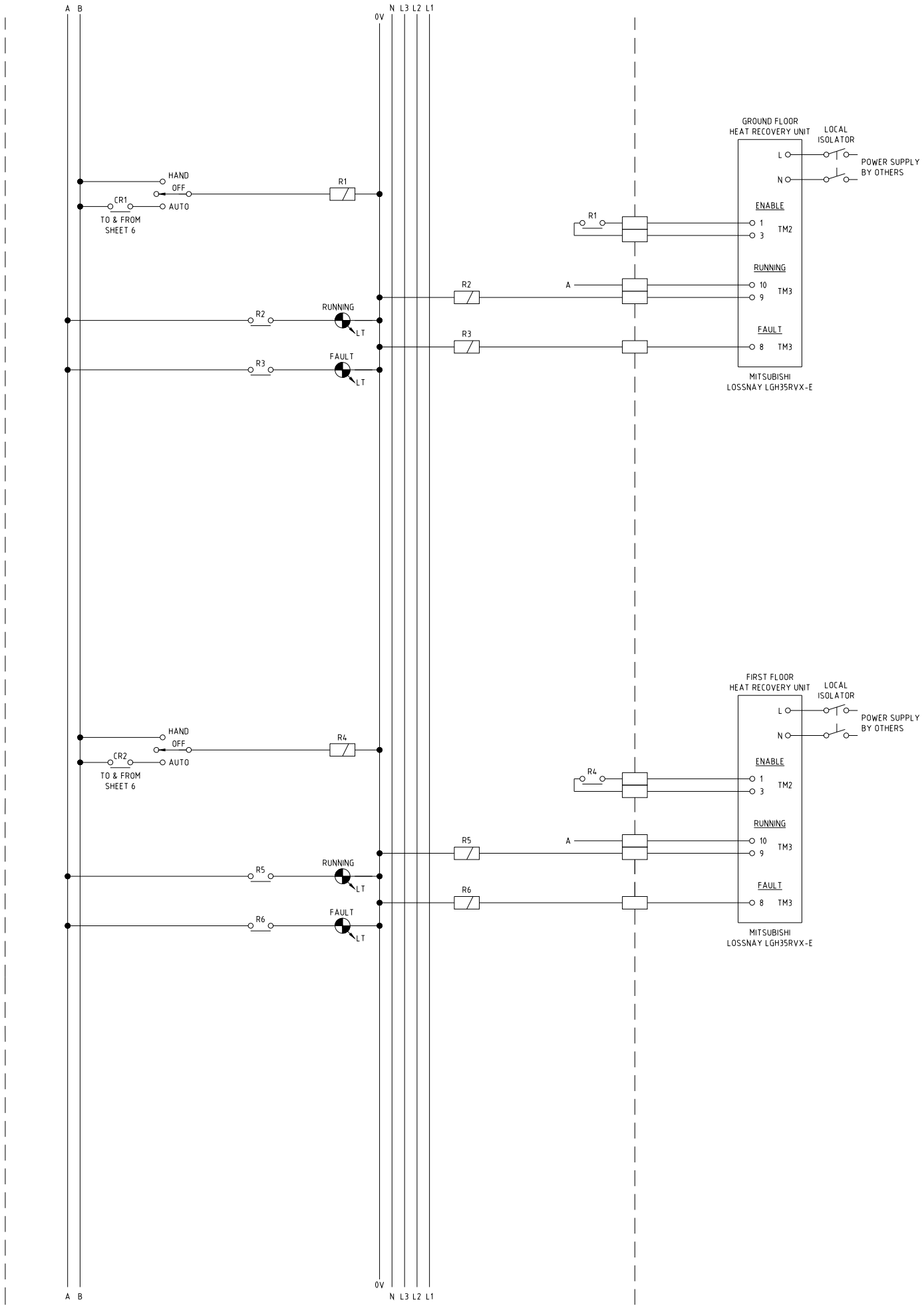
TITLE : HUB VENTILATION MECHANICAL CONTROL PANEL	DRG. No :	ISSUE : A
	PAGE : 1 OF 9	



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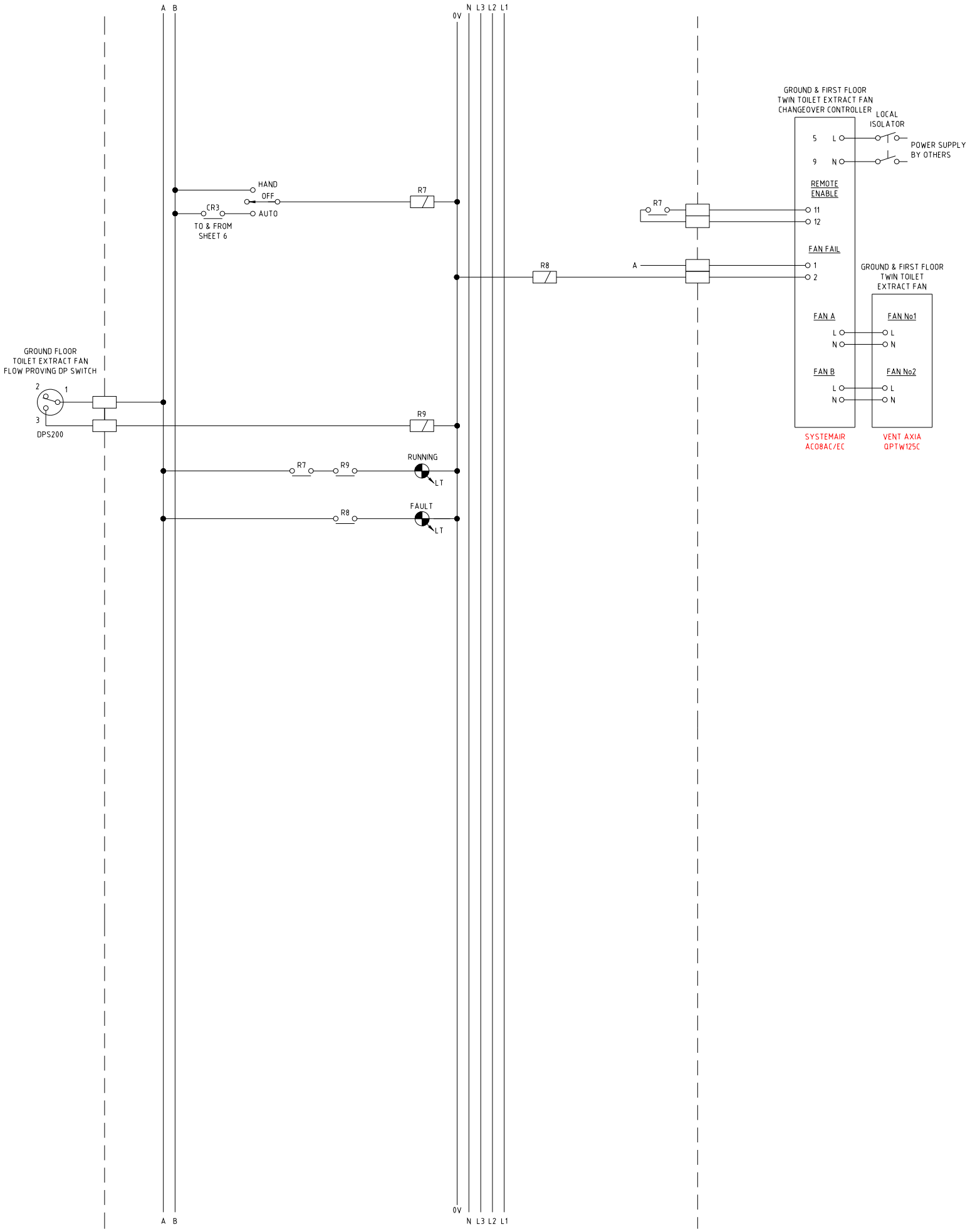

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	PAGE : 3 OF 9	

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SITE : PLOT 9 EMG - EAST MIDLANDS GATEWAY

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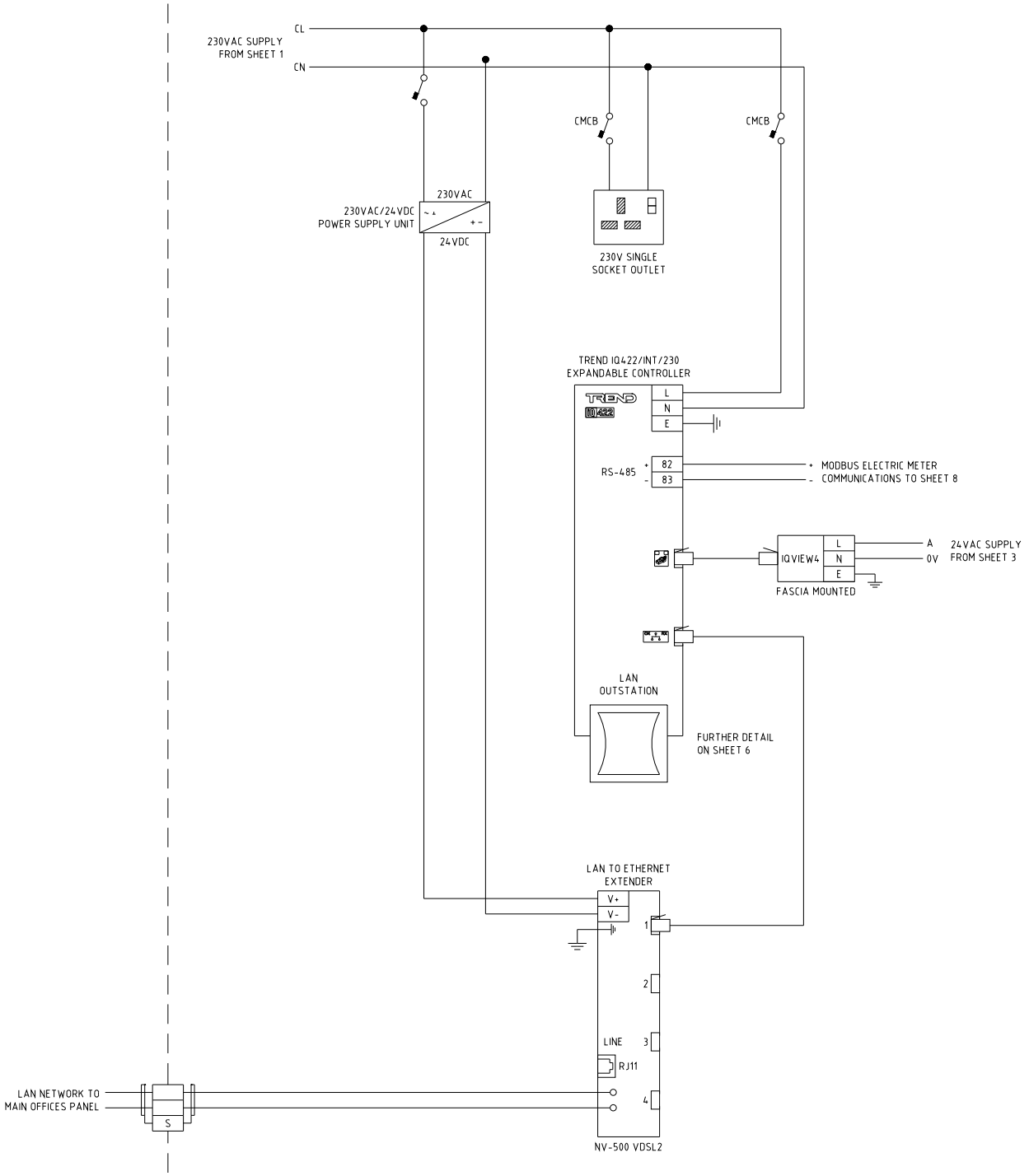
PROJECT No : P2110502
DRG. STATUS : FOR APPROVAL

TITLE : HUB VENTILATION
MECHANICAL CONTROL PANEL

DRG. No :
PAGE : 4 OF 9

ISSUE : A



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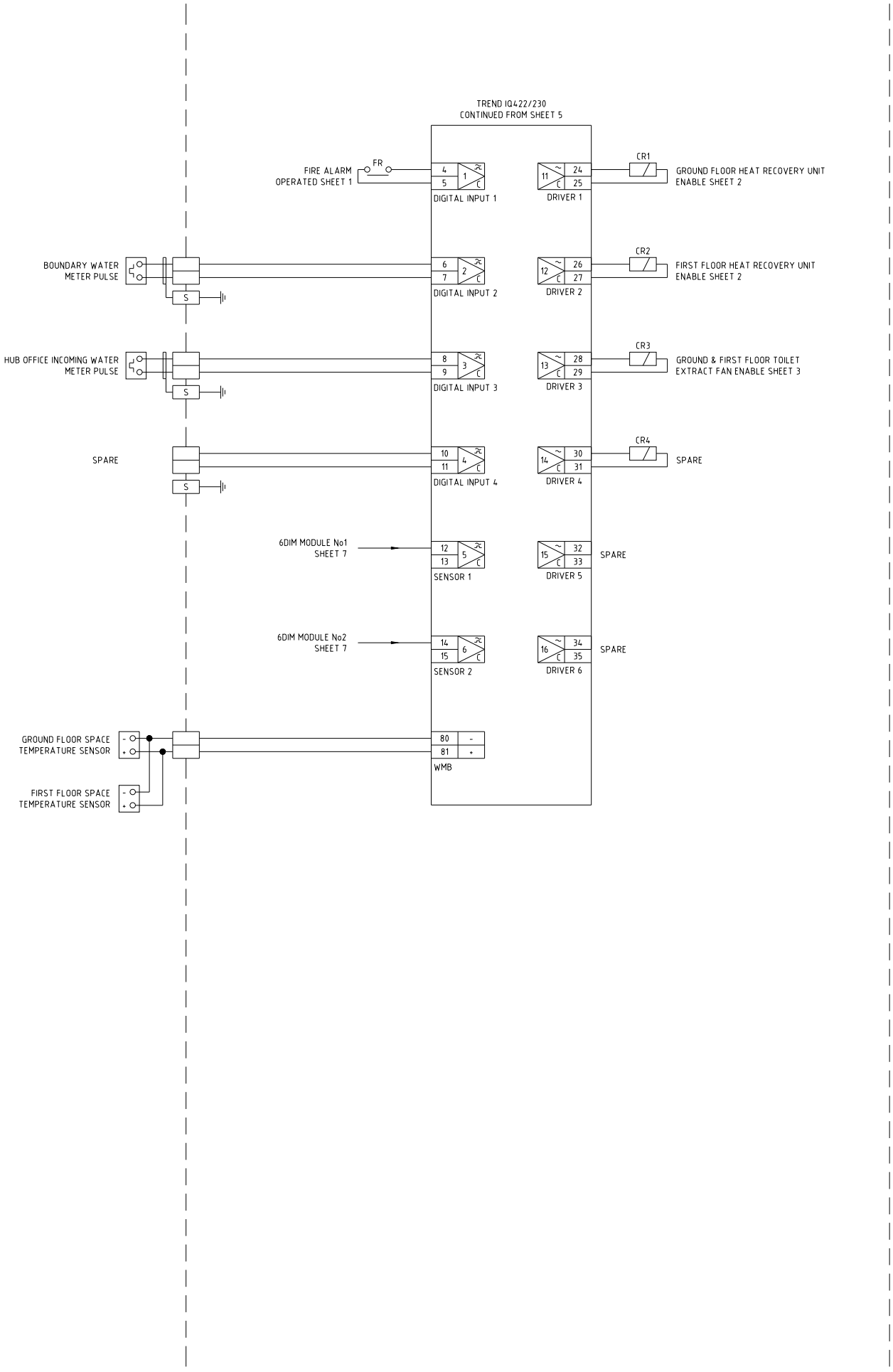
TITLE : HUB VENTILATION MECHANICAL CONTROL PANEL	DRG. No :	ISSUE : A
	PAGE : 5 OF 9	



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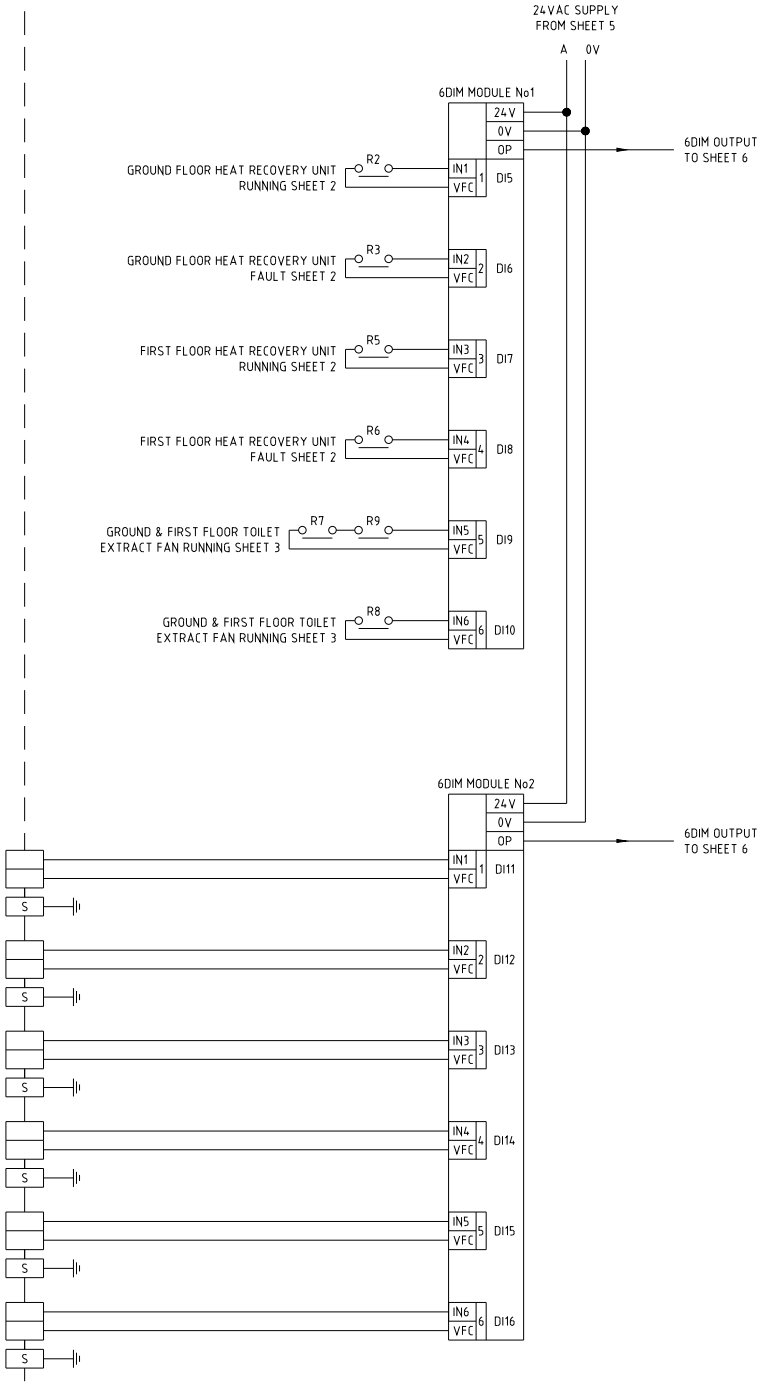

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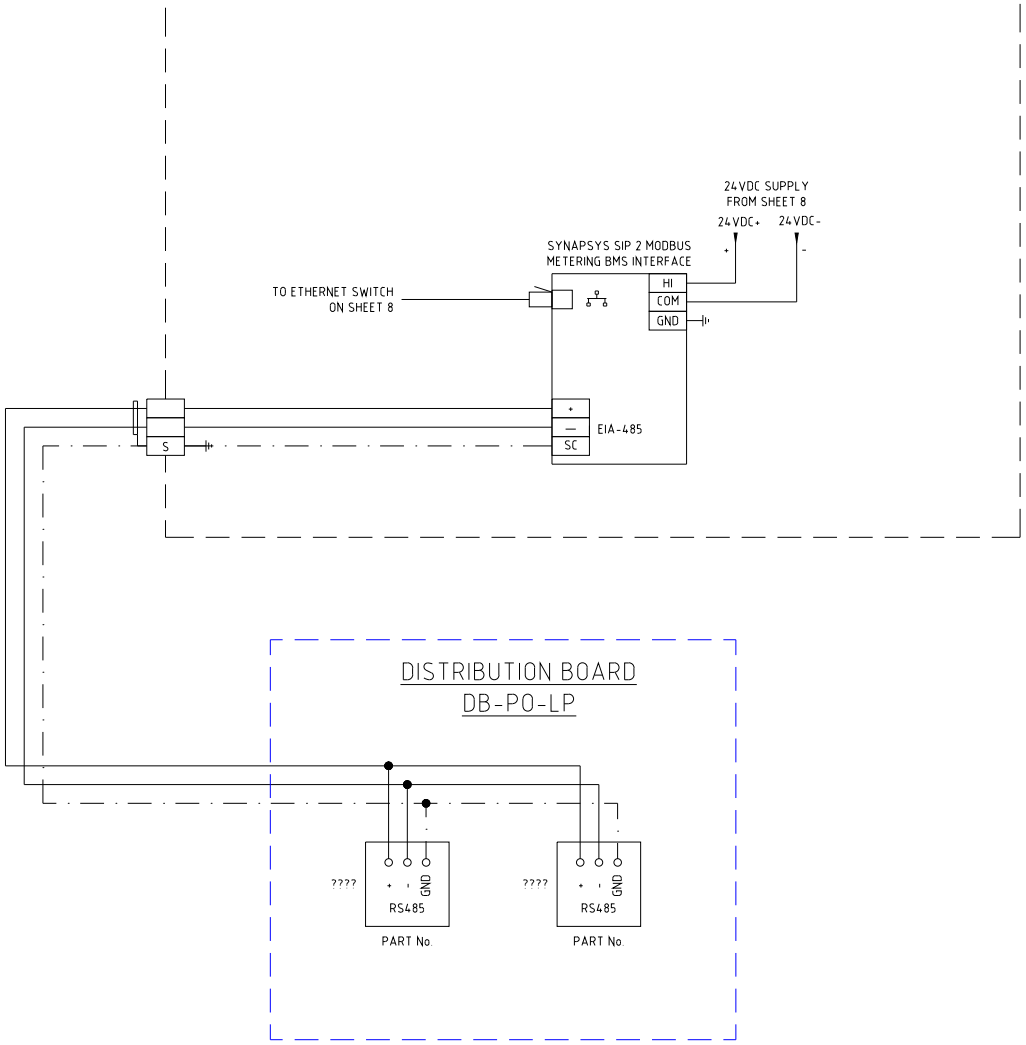
	PAGE : 7 OF 9	



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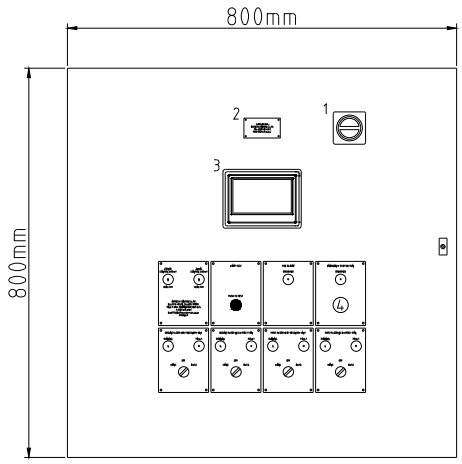
	PAGE : 8 OF 9	



DEPTH:- 260mm

1) CONTROL PANEL ISOLATOR
2) AIRTECH CONTROLS LABEL
3) TREND IQVIEW4 KEYPAD
4) EMERGENCY STOP BUTTON

230VAC CONTROL CIRCUIT
W
HEALTHY

24VAC CONTROL CIRCUIT
W
HEALTHY

AIRTECH CONTROLS LTD
ELLIOTT HOUSE, ELLIOTT ROAD
SELLY OAK, BIRMINGHAM, B29 6LS
T: 0121 415 4141
E: office@airtechcontrols.co.uk
P1911247

LAMP TEST

PUSH TO TEST

FIRE ALARM

OPERATED
R

EMERGENCY STOP BUTTON

OPERATED
R

4

GROUND FLOOR HEAT RECOVERY UNIT

RUNNING
G

FAULT
R

OFF
HAND
AUTO

FIRST FLOOR HEAT RECOVERY UNIT

RUNNING
G

FAULT
R

OFF
HAND
AUTO

GROUND & FIRST FLOOR WC EXTRACT FAN

RUNNING
G

FAULT
R

OFF
HAND
AUTO

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TITLE : HUB VENTILATION MECHANICAL CONTROL PANEL	DRG. No :	ISSUE : A
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3. Control Valve Schedule

Plot 9 EMG
Control Valve Schedule

Valve Reference	Circuit	Coil Conns (mm)	Flow Rate kg/s	Coil PD kPa	Valve KV	Valve PD kPa	Authority %	Valve Size (mm)	Valve / Actuator Type
MCV1	VT Heating Control Valve	15	0.062	N/A	1	5.14	N/A	15	R3015-1-S1 / LR24A-SR
MCV2	DHWS Calorifier Control Valve	20	0.312	N/A	N/A	N/A	N/A	20	R2020-S2 / LR24A-SR

Project Name	Project No.	Sheet	Revision	AirTech Controls Ltd
Plot 9 EMG	P2110502	1 of 1	A	

AirTech Controls Ltd

3. MCP Electrical Load

Data Sheet

IQ4E/..
Controller

IQ4E Controller

Description

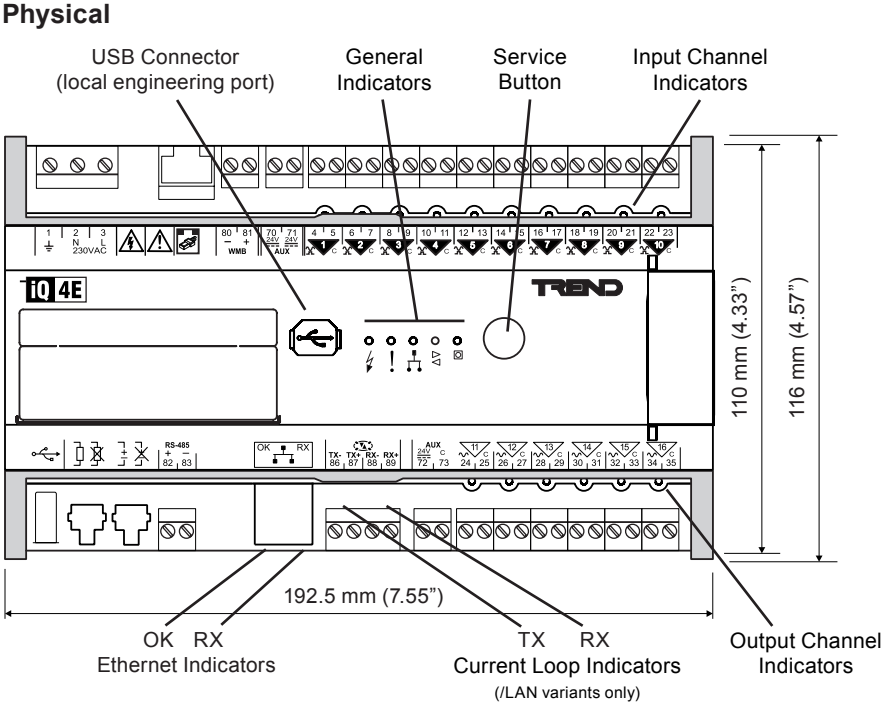
The IQ®4E controller has 10 universal inputs and 6 analogue voltage outputs and is expandable up to 192 points (depending on the controller variant) by adding I/O modules. This flexibility makes it suitable for a broad range of applications.

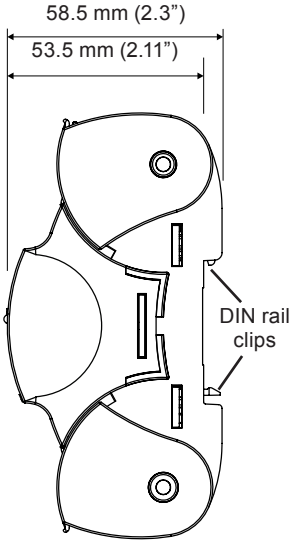
The IQ4E controller uses Ethernet and TCP/IP networking technologies with embedded XML and is fully compatible with other Trend IQ controllers. The IQ4E supports BACnet over IP as standard. Trend communications over a current loop LAN is available as an option. A local PC or display (e.g. IQView4) can be connected to the RS232 port. A Wallbus port is also provided for use with room displays.

Features

- 16 onboard I/O channels - 10 inputs and 6 outputs
- I/O bus supports up to a total of 192 I/O channels (depending on the controller variant) using additional I/O modules
- I/O bus length up to 300 m (328 yards)
- Ethernet 10/100 Mbps main network with TCP/IP protocol
- Trend current loop LAN option
- Embedded XML Web Services as standard
- BACnet over IP
- Wallbus for connection of room displays
- RS232 and USB local supervisor/engineering ports
- Automatic time synchronisation and daylight saving via SNTP
- DIN rail mounting, DIN 19 size 2 standard enclosure
- 230 Vac input power supply

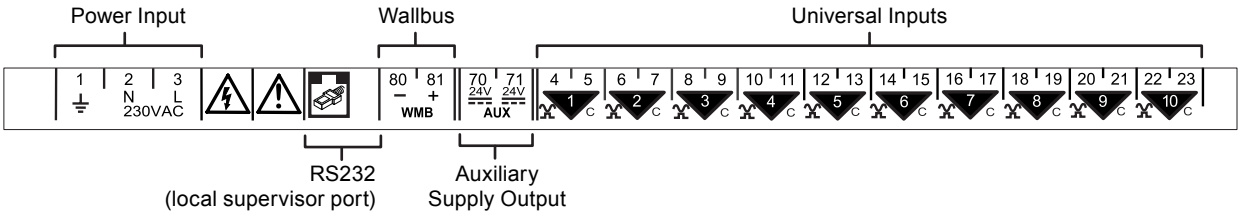
Physical



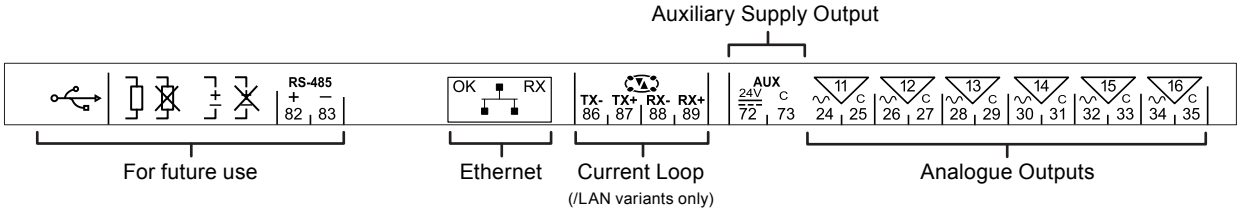


Physical (continued)

Terminal Labels
Upper Label



Lower Label

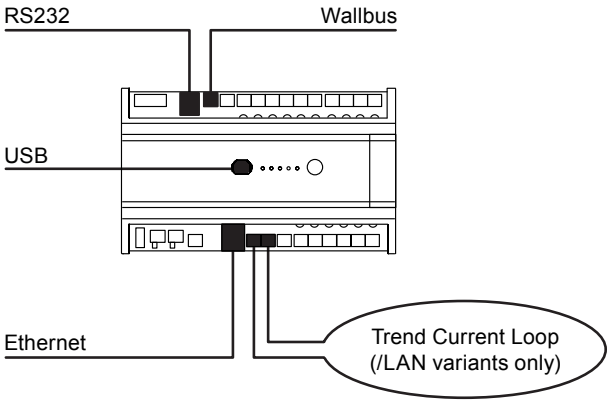


FUNCTIONALITY

The IQ4E's functionality can be divided into four sections: System, Hardware, Firmware, and Strategy.

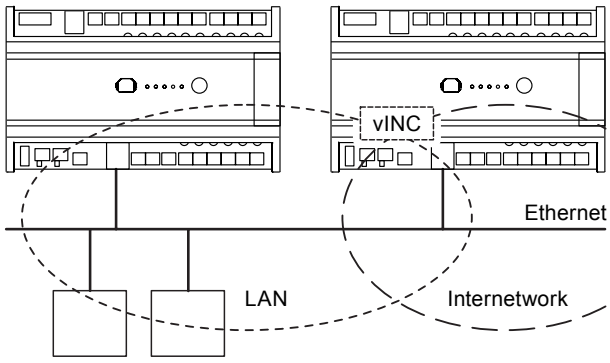
SYSTEM

The IQ4E has communication ports for Ethernet, USB (Local Engineering), RS232 (Local Supervisor) and Wallbus. In addition /LAN variants have a Trend current loop:



Ethernet

On units that do not have the current loop option (or on /LAN variants that have the current loop disabled) the IQ4E can form a Trend LAN with other devices over the Ethernet network.



In addition, the IQ4E has the ability to join an internetwork using its virtual INC (see 'Networking' on page 4 for further details).

Other devices connected to the Ethernet network can communicate with the IQ4E using IP addressing. Remote PCs can communicate through standard IT networks using IP, enabling communication from anywhere in the world.

Note: Communication with the Trend network by a supervisor, tool or display will require the use of a virtual CNC (vCNC) in the IQ4E or another CNC on the network (see 'Networking' on page 4 for further details).

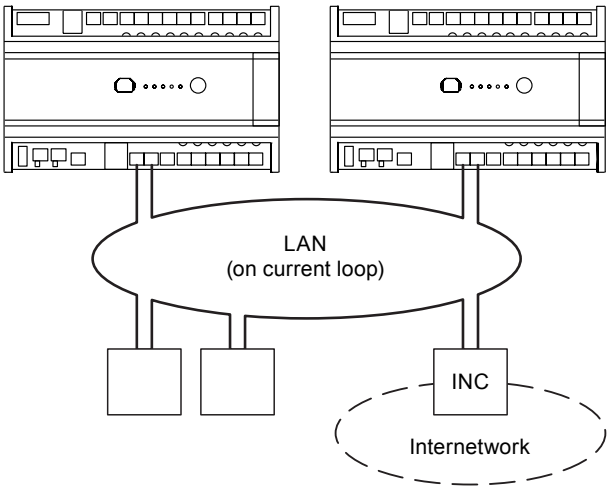
An integral web interface is also accessible over an Ethernet/IP connection (see 'Web Pages' on page 8).

The IQ4E supports either static or dynamic (DHCP) IP addressing. DHCP is enabled by default.

Each IQ4E has a unique MAC (Media Access Control) address allocated to its Ethernet node. This can be used to help identify the IQ4E during configuration.

Current Loop (../LAN variants only)

On units that have the current loop option (which is enabled), the IQ4E will form a Trend LAN with other devices on the current loop.



Note: In this configuration IQ4E cannot join a Trend LAN on Ethernet. However, access by IP is still possible.

In order to join an internetwork, an INC type device will be required elsewhere on the current loop LAN.

The current loop may be wired in either a 2-wire or 4-wire configuration.

Network Bypass Relay: If the IQ4E loses power a set of bypass relays will close to maintain the integrity of the current loop network. If the relays close it will be recognised by a downstream device, and reported as a LAN Changed alarm.

Baud Rate: By default the IQ4E auto-detects the baud rate to use on the current loop. Where required, the rate can be set manually using configuration software.

RS232 (Local Supervisor Port)

An RS232 port is provided for the optional connection of local display devices, sensors or supervisory tools. Only one device may be connected at one time.

The connected device can be restricted to communicate only with the IQ4E or (if supported by the device) with the entire Trend network (see 'Networking' on page 4).

USB (Local Engineering Port)

The USB port allows connection of a PC running SET (System Engineering Tool). When connected in this way SET can communicate across the entire Trend network (see 'Networking' on page 4).

When not in use the connector is protected by a retained flexible plastic plug.

Wallbus

The Wallbus port facilitates the connection of room display devices (e.g. an RD-WMB series room display).

These devices offer control and indication of parameters such as setpoint, fan speed and occupancy, as well as sensing temperature, humidity and CO_2 levels.

BACnet Communications

The IQ4E controller is designed to be a BACnet Application Specific Controller. BACnet is an open protocol that enables the products of a number of different manufacturers of building automation and control equipment to communicate with each other. It supports communication using BACnet over IP (Ethernet) including:

- Access to IQ4E parameters over BACnet,
- Alarm delivery,
- IC comms to a BACnet device.

A full specification of the objects, properties, and BIBBS (BACnet Interoperability Building Blocks) supported by the IQ4E are given in the IQ4 Protocol Implementation Conformance Statement (TP201248). The mapping of the BACnet properties to the Trend parameters is covered in the IQ4 Configuration Manual (TE201263).

XML Web Services

The IQ4E includes XML web services. XML is a general purpose specification for creating custom markup languages. It helps developers create web pages and also provides a basic syntax that enables information to be shared by different computers and applications. The IQ4E XML syntax is described in the IQ4 Configuration Manual (TE200768).

Inputs and Outputs

The IQ4E has 10 universal inputs and 6 analogue outputs, plus three 24 Vdc auxiliary supply output terminals for powering certain types of I/O devices. See 'Hardware' on page 4 for further details.

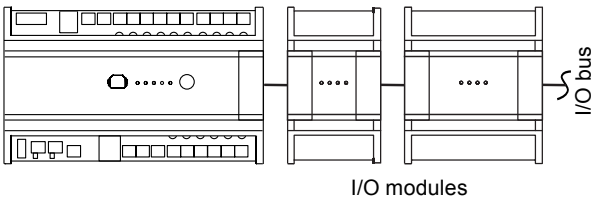
Cable Screening

The use of screened cable for input and/or output connections is not generally required unless the cable passes through electrically noisy environments.

If screened cable is used the screen must be connected to the local panel/enclosure ground and left unterminated at the far end.

I/O Expansion Modules

Further I/O channels can be added to the IQ4E by the connection of various types of I/O expansion modules to the I/O bus.



Several IQ4E variants are available to provide support for differing numbers of I/O channels up to a maximum of 192 (16 onboard, 176 on I/O bus) (see 'Order Codes' on page 10).

The following I/O module ranges are compatible with the IQ4E:

- **IQ4/IO** see IQ4/IO Modules Data Sheet (TA201341).
- **XCITE/IO** see XCITE/IO Modules Data Sheet (TA201352).

Up to 30 modules can be connected to the I/O bus, depending on the module range(s) used and the number of I/O channels supported by the controller (as described above).

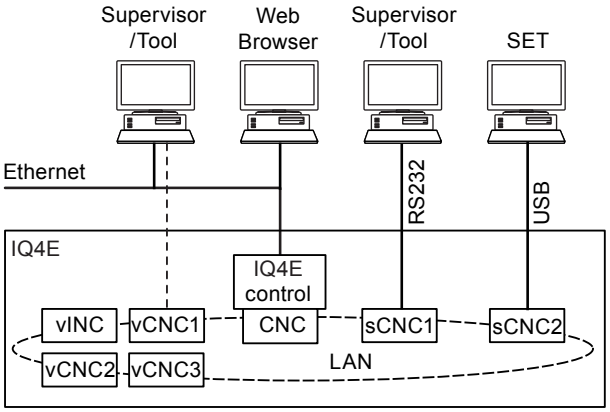
Module Range	IQ4/IO only	IQ4/IO and/or XCITE/IO
Number of Modules	30	15

The last module on the I/O bus must be fitted with a terminator. A suitable terminator (compatible with IQ4/IO modules only) is supplied with the IQ4E.

Networking

In order to connect to the Trend network the IQ4E will create its own internal LAN which includes the following nodes:

- a CNC for its own controller,
- a supervisor CNC (sCNC1) for its RS232 port,
- a supervisor CNC (sCNC2) for its USB port,
- three virtual CNCs (vCNC1, vCNC2 and vCNC3), and
- a virtual INC (vINC).



Default CNC Addressing: The IQ4E device (outstation) address is factory-set (in the Address module) as follows:

Local LAN set to 20;
Local Address set on a rolling basis in the range 11 to 119, so that in a batch of IQ4Es, each will have a different default address (printed on the unit's serial label).

sCNC1 Functionality: If the RS232 port address is set to 0 (default), sCNC1 is disabled and a connected device can only communicate with the IQ4E. If the address is configured to be non-zero, sCNC1 is enabled with that address on the LAN and allows a connected device to communicate with the entire Trend network.

sCNC2 Functionality: When a PC running SET is connected to the USB port it uses sCNC2. If the USB port address is set to 0 (default), sCNC2 is dynamically created at address 125 for the duration of the SET session. When the PC is removed sCNC2 times out and no longer exists on the network. If the address is configured to be non-zero, sCNC2 remains on the network at all times.

vCNC Functionality: Allows a supervisor tool/display to make a permanent connection to the Trend network using TCP/IP. . By default all three vCNCs are disabled.

vINC Functionality: When the IQ4E joins a LAN on Ethernet, the controller with the lowest IP address assumes INC functionality (using its vINC at address 126); any vINCs in other controllers on that LAN will automatically be disabled. The vINC does not exist on a current loop LAN.

IC Comms: The IQ4E can communicate with other IQ controllers and BACnet devices using IC Comms. Some controllers running earlier versions of firmware may not support all IC Comms types. See 'Compatibility' on page 9.

HARDWARE

Universal Inputs (IN1 to IN10)

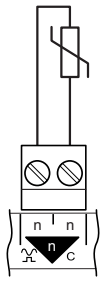
Each input channel will function as one of the following:

- thermistor input,
- voltage input,
- digital input, or
- current input.

The input function is set automatically by the IQ4E strategy.

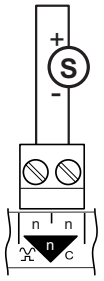
Thermistor input: Used for a thermistor (NTC 10 kΩ @ 25°C (77°F), -40 to 110°C (-40°F to 230°F)), potentiometer (300 Ω to 500 kΩ) or fan speed control. The thermistor bridge resistor is 12 kΩ with a bridge supply 3.3 V.

Example wiring



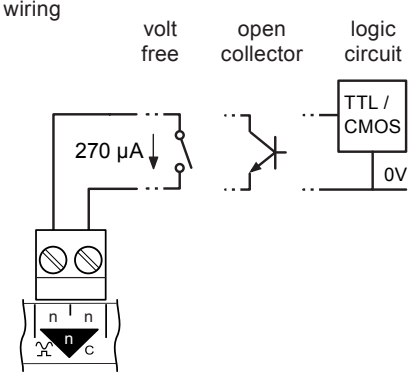
Voltage input: Used with a 0 to 10 Vdc source.

Example wiring



Digital input: Used for a volt free contact, logic circuit (e.g. TTL, CMOS), open collector (transistor) or open drain (FET).

Example wiring



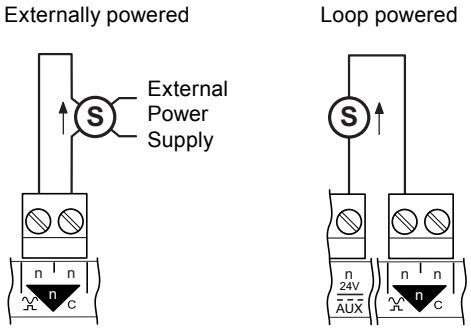
The volt free contact has a nominal wetting current of 270 µA. The input is ON when the contact is closed.

An open collector or open drain must be able to sink 270 µA. The input is ON when the transistor or FET conducts. Correct polarity must be observed.

A logic circuit must be able to sink 270 µA. The input will be ON when the voltage present on the input terminal is less than 2 Vdc (minimum 0 V). A voltage greater than 3.5 Vdc (maximum 50 Vdc) or open circuit will turn the input OFF. Voltage levels between 2 and 3.5 Vdc may cause indeterminate operation.

Current input: Used for 0 to 20 mA sources which can be externally powered or loop powered (from the Auxiliary Supply Output, i.e. one of the AUX terminals).

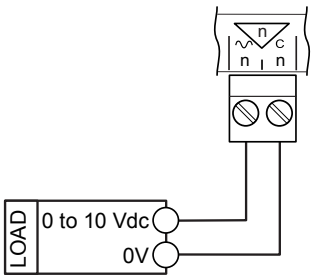
Example wiring



Analogue Outputs (OUT11 to OUT16)

These provide a variable control voltage between 0 and 10 Vdc. The output can source up to 20 mA (see 'Combined Supply') and sink up to 3 mA.

Example wiring



Auxiliary Supply Output

This output can be used to supply I/O devices (e.g. sensors). It provides 24 Vdc ±5% from AUX terminals 70, 71 and 72, with a return through terminal 73 or any 'C' terminal.

The maximum available current is internally limited as follows:

Auxiliary Output (AUX) Terminals		
70	**71**	**72**
120 mA shared		120 mA

The available current also depends on other current demands (see 'Combined Supply').

Combined Supply

The IQ4E's combined supply provides power for the:

- Analogue outputs,
- Auxiliary supply terminals,
- Wallbus,
- RS232 port,
- USB port, and
- I/O Bus supply.

If the total power requirement of the combined supply is more than the controller can supply it will be necessary to power some to the items using external power sources.

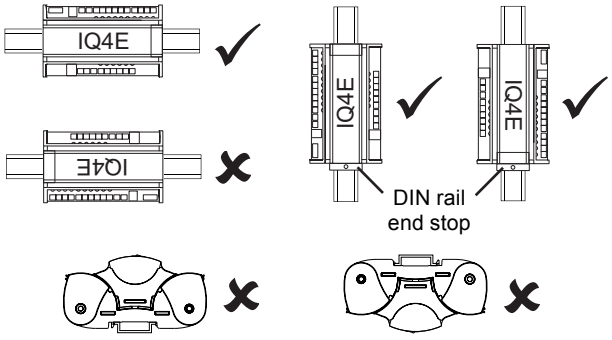
For further details on calculating the available current from the combined supply, see the IQ4 Configuration Manual (TE201263).

Enclosure

The IQ4E is housed in a polycarbonate case. Integral spring clips on the back of the case enable the unit to be clipped on to (and quickly released from) a standard TS35 DIN rail.

The IQ4E must be installed in a secondary enclosure with a minimum protective rating of IP20 (or equivalent).

The unit may be mounted horizontally or vertically but not upside down or on its back:

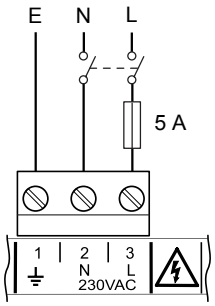


Rotating clear polycarbonate covers provide access for the power, communications and I/O connections.

Input Power Supply

The IQ4E requires a 230 Vac ±10%, 50/60 Hz supply The input power earth (ground) terminal is isolated from the input power neutral, and must be separately earthed (grounded) locally; this ground terminal is internally connected to the IQ4E electronics earth (ground).

The 230 V supply must include a dedicated 5 A fuse complying with IEC60269 (BS1362) and a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit. A 5 A circuit breaker with high breaking capacity may be used as an alternative.



Service Button

Can be used to generate a network message which identifies the IQ4E by means of its unique serial number to system tools, e.g. to find the IQ4E's device address and LAN number.

It can also be used to reset the IQ4E to its factory default condition; for further details see the IQ4 Configuration Manual (TE201263).

Indicators

Various indicators are provided giving feedback on the operational status of the controller.

General (in centre of cover):

Indicator	Colour	Function
Power	Green	Condition of input power supply
Watchdog	Red	Presence of a firmware/strategy fault
LAN OK	Green	Status of the Trend LAN (operational on /LAN variants only)
I/O Bus	Green	Status of connection to I/O modules
Service	Yellow	Service button activated. Flashes if a powered device is connected to the USB port when IQ4E is *not* powered

Trend Current Loop (adjacent to current loop connector - operational on /LAN variants only):

Indicator	Colour	Function
RX	Yellow	Status of connection to previous device
TX	Yellow	Status of connection to next device

Ethernet (on end of Ethernet connector):

Indicator	Colour	Function
OK	Green	Status of connection (Ethernet LINK)
RX	Yellow	Presence of data reception

Inputs/Outputs (in line with the appropriate I/O terminals and next to the label):

Indicator	Colour	Function
Input	Yellow	On/Off state of associated input (digital input mode only)
Output	Yellow	Light intensity varies with output voltage

Backup

The data (firmware, strategy, parameters) is stored in flash memory which is non-volatile in the case of power failure. Changes to the address module are stored immediately. Other changes are generally stored around midnight, in addition structural changes (e.g. module interconnections) are stored 15 s after the last change, and critical data changes (e.g strategy values), are stored on power failure or other similar fault conditions. The tools (e.g. SET) will send an archive instruction after parameter changes causing immediate storage of changes.

A supercap is used to maintain the real time clock (time and date). In the event of power failure this will support the clock for 8 days (typically).

Note: Operation at elevated temperature or high humidity levels will reduce the lifetime of the supercap. Extended operation in these conditions may permanently reduce the capacity of this component and result in a reduction in the number of days that the controller can successfully backup the time and date.

Labels

A small two part label is attached to the unit which displays the unit's serial number and MAC address (in both text and barcode format). Space is provided on the label for recording the unit's device (outstation) address, LAN number and IP address (if DHCP is not being used). It has a tear-off self-adhesive label strip that also contains the serial number and MAC address (text and barcode) which can be adhered to a paper record, e.g. a building plan or log book.

A second large adhesive label is also supplied which contains the unit's serial number in text and barcode formats. This is intended to be mounted on the outside of the equipment cabinet or enclosure containing the IQ4E. If the unit is located in a difficult-to-reach location, this label can be scanned from a distance using a suitable barcode scanner.

The barcodes on both labels conform to the 'code 128 auto' format.

FIRMWARE

The firmware in the IQ4E controls its basic functionality and provides a range of modules that can be configured to produce a control strategy.

Modules

The range of modules provided in the IQ4E firmware are listed in the table below. Full details of each module can be found in the IQ4 Configuration Manual (TE201263).

Module	brIQs	Max. number of Modules	Note
Address	24	1 (fixed)	③
Alarm Destination	14	(8)	
Alarm Group	9	500	
Alarm Route	9	500	
Alarm Log	0	1 (fixed)	③
Analog Node	16	510	
Digital Byte	16	1012	
Digital Input	28	1500	①
Directory	13	500	
Display	19	1500	
Driver	57	500	①
Function	19	1000	①
IC Comms	19	250	①
Interface	130	500	①④
I/O Module	14	30	
Knob	13	1500	
Logic	19	1000	①
Loop	55	500	
Network	0		③
NTD	30	limited by max. brIQs only	
Option	0		③
OSS	34	500	
Page	4	500	
Plot	12	500	
Program	0	1 (fixed)	③
Schedule Offset	21	500	
Sensor	76	1500	①
Sensor type	12	99	
Sequence	106	1 (fixed) *(see opposite for max. steps)*	
Switch	10	1500	
Time	38	1 (fixed)	
Time Schedule	566	100	②
User	12	500	
Virtual CNC	9	3	③

Notes:
① *The number of brIQs used on these modules varies with the module type. The largest size is shown here.*
② *The Time Zone module brIQ count given here allows for 20 exceptions. Further exceptions requires 13 brIQs each.*
③ *These modules are always present in the IQ4E.*
④ *Additional 5 brIQs required per input and output.*

The quantity of each type of module may be adjusted to match the requirements of the application subject to the following:

- A maximum of 4000 modules in total,
- A maximum for each type of module, and
- The IQ4E's memory capacity (measured in 'brIQs').

The maximum number of modules for each type, and the number of brIQs required per module are shown in the table above.

The total available memory capacity varies with the number of supported I/O channels:

number of I/O channels	maximum brIQs available
16	30,000
32	30,000
64	30,000
96	45,000
128	60,000
160	75,000
192	90,000

Plot Modules
The IQ4E's Plot modules can plot any connectable module output (analogue or digital). There are four types of Plot module: synchronised, triggered, periodic and COV. Although all three types are BACnet interoperable, only periodic plots can be compliant with the BACnet standard. All Plot modules can generate a buffer ready alarm when the number of records equals a notification threshold.

The maximum number of records per plot is 1000. The maximum total number of records (for all plots) depends on the plot memory available and the type of plots used - each synchronised plot record requires 5 log points, while each triggered or periodic plot record requires 10 log points:

number of I/O channels	maximum plot memory (log points)	max. number of records	
		synchronised plots	triggered or periodic plots
16	1,000,000	200,000	100,000
32	1,000,000	200,000	100,000
64	1,000,000	200,000	100,000
96	1,000,000	200,000	100,000
128	1,000,000	200,000	100,000
160	1,250,000	250,000	125,000
192	1,500,000	300,000	150,000

Note: A maximum of 100 plots can be serviced in a 1 s period (e.g. 100 x 1 s plots only). This is calculated on the average plots serviced in 1 s, so a 1 minute plot would contribute a 1/60. For example 90 x 1 s plots plus 360 x 1 min would give 96 (90+6) plots per second on average. The periodic and triggered plots must also be counted and it's up to the engineer to make his best estimate.

Sequence Table Module
The maximum number of steps in the sequence table varies with the number of supported I/O channels:

number of I/O channels	maximum sequence steps
16	600
32	600
64	640
96	960
128	1280
160	1600
192	1920

Firmware Upgrades

New versions of firmware may be made available from time to time to change or add functionality or to provide support for new products.

Firmware can be upgraded using a PC running the IQTool Firmware Upgrade Applet, and to the IQ4E connected over Ethernet (recommended for speed) or the Trend current loop.

Timemaster

The IQ4E can act as a system Timemaster to synchronise the time and date across the Trend system. It can use SNTP (simple network time protocol) to obtain precision current time from an unauthenticated NTP server on the Internet. Daylight saving can be implemented automatically (via timezone setting) or manually by specified dates and time adjustment.

Alarms

The IQ4E will generate Network, General, and Item alarms. Network alarms are generated by the Trend Network nodes, General alarms are generated when the IQ4E detects a problem within its own hardware or program, and Item alarms are generated by the strategy, and are normally due to a faulty plant condition.

Network alarms are sent to supervisors or tools connected to the RS232 local supervisor port, USB local engineering port, or to one of the controller's vCNCs.

General and Item alarms can be sent either to a designated Trend LAN address, to an IP address, or as an email. Alternatively, certain Item alarms (sensor, digital input, digital driver readback, and plot), can be sent to a BACnet device.

Alarms sent to a Trend LAN address, or to an IP address can either be sent in text, coded, or attribute format. Network alarms are sent in text format only.

For coded alarms the protocol limits the item number to 255 maximum. For text alarms the maximum item label length is 20 characters (although the 963 can be set up to use labels previously learnt).

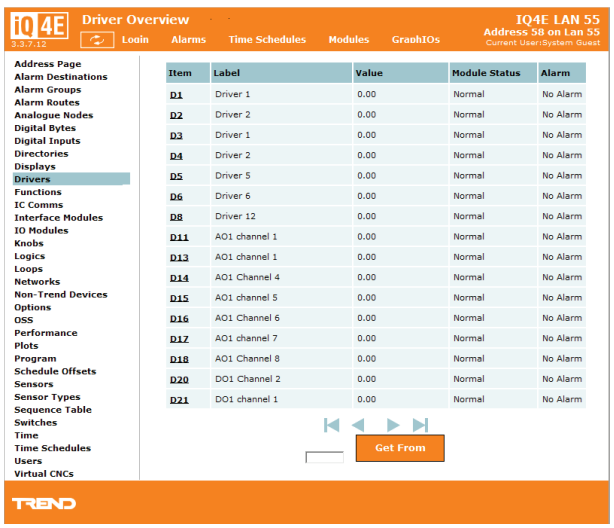
Sending an alarm by email requires the Email Server Address to be set up in the address module. The Email Server Address can be an IP address, an internet domain name, or a host name; the internet domain name or host name require a DNS server address or a WINS server address respectively to be set up in the network module so that the name can be resolved.

All alarms (except Network alarms) are also stored locally in the Alarm Log. The alarm log can record up to 300 alarms. Once this limit is reached each new alarm will overwrite the oldest record.

Web Pages

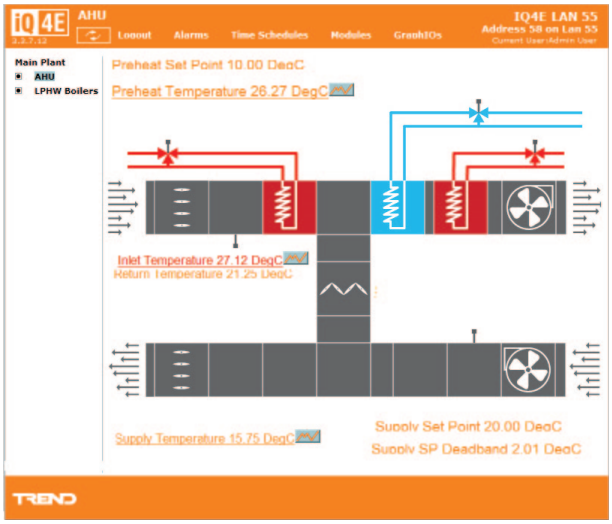
An integral web interface can be accessed over an Ethernet/IP connection using a Web browser on a PC, tablet or smartphone.

Access can be restricted by entry of a valid user name and password. Once connection to the controller has been made, it is possible to view and adjust occupation times, view the alarm log, and view/adjust/graph individual module parameters.



The web interface does not allow the strategy structure to be modified (e.g. changing module interconnections, adding or deleting modules).

Graphical display pages (GraphIQs), which are configured using IQ4E's display and directory modules, can also be accessed.



For further details of web pages see the IQ4 Configuration Manual (TA201263), the IQ4 Web User Guide (TC201256), and the Graphical Display Pages Editor Manual (TE200629).

Language

The user can specify which language the IQ4E uses for the display of web pages and for transmitted alarms. The standard languages are in the controller as supplied. In the controller the Address module has a language parameter which will be set to the default language, but can be changed to any one of the other available languages. The IQ4E can use languages which require 8 bit code (i.e. special or accented characters) and can also operate with right to left languages (e.g. Chinese, Arabic).

Identification

The IQ4E will identify itself as an IQ4 to w comms.

STRATEGY

In order to operate as a controller, the modules provided by the firmware must be configured to define the way the controller is to control the connected equipment. This configuration is known as the strategy. Strategies are configured using the System Engineering Tool (SET).

This produces a strategy file (*filename*.IQ4) that can be downloaded to the controller to define its operation. This file consists of all the strategy module instances, their parameters, and links. When this is downloaded it is stored in the controller and then run using the controller firmware.

For details of using SET see the System Engineering Tool Manual (TE200147).

FIELD MAINTENANCE

The IQ4E requires no routine maintenance.

WARNING: Contains no serviceable parts. Do not attempt to open the unit. Failure to comply may cause damage to the unit.

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF IQ4E.

RECYCLING ♻.
All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

WEEE Directive:

At the end of their useful life the packaging, and product should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.
Do not burn.

COMPATIBILITY

Browsers: This device has been successfully tested with Internet Explorer (v10 & 11), Chrome (v29.0.1547.0), Mozilla Firefox (v23), Safari (v5.1.7) and with the default browser on the following device operating systems:

Apple iOS 8.1.3
Android 5.0 'Lollipop'
Windows Phone 8.1

It should work with all modern browsers, smart phones, and tablets (with JavaScript enabled) available at the date of release of this product.

Owing to the rapidly changing nature of web devices, new devices and browsers will become available after the release of this product. If you would like to check the compatibility of IQ4E with your device, please connect to: iq4demo.trendcontrols.com. Log in with username: mobile and password: trend.

Supervisors and Displays: 963 v3.5 or greater, 916, IQView, IQView4, IQView8, RD-IQ, SDU-xcite.

Note: The NDP is not compatible with IQ4E; it will not recognise an IQ4E connected to its network.

Wallbus: RD-WMB, RS-WMB, RV-WMB.

Utility Software: SET v7.0 or greater

I/O Modules: IQ4/IO range, XCITE/IO (IQ3) range.

Controllers: IQ3/IQ4 directly and IQ1, IQ2, IQL by way of XTEND. IQ4E/../LAN communicates with IQ2, IQ1 directly. IQeco by way of IQ4NC.

IC Comms: IQ4, IQ3, IQ2, IQeco, IQL, and IQ1 (v3 onwards).

Note: Some controllers running earlier versions of firmware may not support all IC Comms types. Refer to the IQ4 Configuration Manual (TE201263) for full compatibility details. For details on using IC Comms with IQL controllers refer to the Trend LonWorks Products Engineering Manual (TE200292).

Strategies: IQ1, IQ2, IQ3 can be imported into SET, converted into IQ4 strategies, and then downloaded into an IQ4E. If the strategy file accesses I/O channels beyond those available in the IQ4E the strategy will be rejected.

Ethernet Nodes: XTEND, NXIP, or EINC.

Note: NXIP or EINC must not be used in an automatic IP addressing (DHCP) environment.

BACnet Devices: IQ4E Compatibility is defined in IQ4 Product Implementation Conformance Statement (TP201248).

INSTALLATION

The IQ4E is designed to be clipped on to a standard TS35 DIN rail. The IQ4E must be installed in a secondary enclosure with a minimum protective rating of IP20 (or equivalent).

The installation procedure involves:

Mounting the controller in position
Connecting power
Connecting Ethernet (if required)
Connecting RS232 (if required)
Connecting Current Loop (../LAN only)
Connecting the I/O channels (as required)
Connecting Wallbus (if required)
Mounting and connecting additional I/O modules (if required)
Powering up
Setting up IP address parameters (if using Ethernet)
Setting up LAN number and device address,
Checking network
Configuring the strategy
Testing strategy using Controller Simulation in SET
Downloading strategy and other configuration files
Check BACnet communications
Connecting inputs and checking operation
Connecting outputs and checking operation

A full description of installing the unit is given in the IQ4E Installation Instructions - Mounting (TG201338) and IQ4E Installation Instructions - Configuring (TG201339).

ORDER CODES

IQ4E/[CHAN]/[LAN]**/BAC/**[Power]

[CHAN]	Number of supported I/O channels: 16, 32, 64, 96, 128, 160, 192	
[LAN]	Blank	No Trend current loop
	LAN	Trend current loop option fitted
[Power]	230	230 Vac input power supply

Note: XML web services are included as standard in the IQ4E.

IQ4E/16/BAC/230	IQ4E with 16 I/O channels and 230 Vac supply
IQ4E/32/BAC/230	IQ4E expandable to 32 I/O channels and 230 Vac supply
IQ4E/64/BAC/230	IQ4E expandable to 64 I/O channels and 230 Vac supply
IQ4E/96/BAC/230	IQ4E expandable to 96 I/O channels and 230 Vac supply
IQ4E/128/BAC/230	IQ4E expandable to 128 I/O channels and 230 Vac supply
IQ4E/160/BAC/230	IQ4E expandable to 160 I/O channels and 230 Vac supply
IQ4E/192/BAC/230	IQ4E expandable to 192 I/O channels and 230 Vac supply
IQ4E/16/LAN/BAC/230	IQ4E with 16 I/O channels, Trend current loop and 230 Vac supply
IQ4E/32/LAN/BAC/230	IQ4E expandable to 32 I/O channels, Trend current loop and 230 Vac supply
IQ4E/64/LAN/BAC/230	IQ4E expandable to 64 I/O channels, Trend current loop and 230 Vac supply
IQ4E/96/LAN/BAC/230	IQ4E expandable to 96 I/O channels, Trend current loop and 230 Vac supply
IQ4E/128/LAN/BAC/230	IQ4E expandable to 128 I/O channels, Trend current loop and 230 Vac supply
IQ4E/160/LAN/BAC/230	IQ4E expandable to 160 I/O channels, Trend current loop and 230 Vac supply
IQ4E/192/LAN/BAC/230	IQ4E expandable to 192 I/O channels, Trend current loop and 230 Vac supply

UPGRADES

If the number of supported I/O channels needs to be increased, the following controller upgrades are available:

IQ4E/16-32/UP	Upgrade from 16 to 32 channels
IQ4E/32-64/UP	Upgrade from 32 to 64 channels
IQ4E/64-96/UP	Upgrade from 64 to 96 channels
IQ4E/96-128/UP	Upgrade from 96 to 128 channels
IQ4E/128-160/UP	Upgrade from 128 to 160 channels
IQ4E/160-192/UP	Upgrade from 160 to 192 channels

Note: An upgrade will only increase the number of I/O channels that are supported in the firmware; an upgrade does not change the hardware. Additional I/O modules will be required to make use of the extra channels.

ACCESSORIES

IQ4/IO/..	Range of IQ4/IO modules (see IQ4/IO Modules Data Sheet, TA201341)
XCITE/IO/..	Range of XCITE/IO modules (see XCITE/IO Modules Data Sheet, TA201352)

SPECIFICATIONS

ELECTRICAL

Power Input :230 Vac ±10% 50/60 Hz, 70 VA max.
Fusing :No replaceable fuses required.
Power Failure Protection
Strategy & data :non-volatile flash memory.
Real time clock :supercap, maintained for up to 8 days (typical).
Clock Accuracy :10 s per month (typical).
Cycle Time :Sequence table 1s.

Ethernet Network
Transmission :10/100 BASE-T (IEEE 802.3).
Connection :RJ45, auto MDI-X.
Cable Type :Cat 5e, UTP (unshielded twisted pair).
Distance (to hub) :100 m (109 yds) maximum.
Virtual CNCs :3.
Addresses :Not set by default – set to desired value in range 1 to 119 (excluding 2, 3, & 10) using configuration mode. Address must be unique on LAN.

Current Loop (/LAN variants only)
Transmission :20 mA, two wire current loop, opto-isolated, polarity independent receiver, balanced transmitter.
Baud Rate :1k2, 4k8, 9k6, 19k2, or 38k4; auto-detected (default) or settable in software.
Device Address :1 to 119, (2, 3 and 10 not permitted) settable in software.
LAN Number :1 to 119, (2, 3 and 10 not permitted) settable in software.
Distance (node to node) :dependent on cable type and baud rate (see table below):

Cable	Type	Baud Rate				
		1k2	4k8	9k6	19k2	38k4
Trend TP/2/2/22/ HF/200 Belden 8723	Shielded twisted pair 2 pairs (4 conductors)	1000 m (1090 yds)			700 m (765 yds)	350 m (380 yds)
Trend TP/1/1/22/ HF/200 Belden 8761	Shielded twisted pair 1 pair (2 conductors)					
Belden 9182 Belden 9207	Twinaxial (2 conductors)					

Note: Adjacent devices may specify different maximum cable lengths and baud rates. The shortest cable length (for the chosen baud rate) applies when connecting to the IQ4E current loop.

RS232 Local Supervisor Port
Transmission :RS232, EIA/TIA/232E, V28 supports IQ System comms.
Distance :15 m (16 yards) maximum.
Supply :24 Vdc ±5%; 60 mA maximum*
Baud Rate :9k6.
Address (sCNC1) :1 to 119, (2, 3 and 10 not permitted) settable in software.

USB Local Engineering Port
Transmission :USB 2.0.
Data Rate :480 Mbits/s (Hi-Speed).
Distance :5 m (5 yards) maximum.
Address (sCNC2) :1 to 119, (2, 3 and 10 not permitted) settable in software.

Wallbus
Cable Type :Unscreened twisted pair.
Distance :60 m (200 ft) maximum.
Supply Current :50 mA maximum*.
Number of Devices :up to 14 (subject to power loading)

I/O Bus
Maximum Total Length :300 m (328 yds), using IQ4/IO modules only;
30 m (33 yds), using IQ4/IO and/or XCITE/IO modules.
Maximum Modules :30 (IQ4/IO modules only);
15 (IQ4/IO and/or XCITE/IO modules).
Maximum Channels :192 (including 16 onboard).
Bus Supply 24 Vdc ±5%; 800 mA maximum*.
Cable Type :Belden 3084A (up to 100 m);
Belden 7595A (up to 300 m).
For further details see:
IQ4/IO Modules Data Sheet (TA201341);
XCITE/IO Modules Data Sheet (TA201352).

Inputs/Outputs

Universal Inputs
Number of Channels :10.
Function :Measuring voltage, current, thermistor or digital input (function set by strategy).
Input Noise Rejection :Minimum 60 dB series mode rejection at input power supply frequency.
Input Resolution :12 bit (4096 steps).
Voltage Input
Input range :0 to 10 V.
Input resistance :9.4 kΩ.
Accuracy :±0.5% of span (50 mV).
Current Input
Input range :0 to 20 mA.
Input resistance :120 Ω.
Accuracy :±0.5% of span (100 µA).
Thermistor Input
Temperature (NTC 10 kΩ @ 25°C (77°F))
Input range :-40 to 110°C (-40°F to 230°F)
Accuracy :±0.3°C (-40°C to 90°C (-40°F to 194°F)); ±0.4°C (> 90°C (194°F)).
Resistance
Input range :300 Ω to 500 kΩ
Accuracy :1% of measured value.
Bridge resistor :12.2 kΩ.
Bridge supply :3.3 V.
Digital Input
Input voltage :0 to 5 Vdc typical (50 Vdc maximum).
ON state :<2.5 V @ 270 µA (sink).
OFF state :>3.5 V (or open circuit).
Count rate :30 Hz max. (pulse width ≥16.6 ms).

Analogue Outputs
Number of Channels :6.
Function :Variable control from strategy of valve/damper actuators, voltage to current/pressure converters, relay modules, lighting dimmers, etc.
Voltage Range :0 to 10 Vdc.
Current (maximum*) :up to 20 mA (source) or 3 mA (sink).
Accuracy :±0.5% of span.
Resolution :11 bit (2048 steps).

Auxiliary Supply Output
Voltage :24 Vdc ±5%.
Current (maximum*) :120 mA shared between terminals 70 and 71, plus 120 mA from terminal 72.

**Available current may be affected by demands on other outputs - see 'Combined Supply' on page 5.*

SPECIFICATIONS (continued)

INDICATORS

Power (⚡)	:Green LED
Watchdog (!)	:Red LED
LAN OK (⁂)	:Green LED
I/O Bus (📶)	:Green/Red LED
Service Button (⊙)	:Yellow LED
RX (current loop)	:Yellow LED
TX (current loop)	:Yellow LED
OK (Ethernet)	:Green LED
RX (Ethernet)	:Yellow LED
IN1 to IN10	:Yellow LED
OUT11 to OUT16	:Yellow LED

MECHANICAL

Dimensions (WxHxD)	:192.5 mm (7.55”) x 116 mm (4.57”) x 58.5 mm (2.3”).
Material	
Main body	:Flame Retardant Polycarbonate (white)
Terminal covers	:Flame Retardant Polycarbonate (translucent orange).
Weight	:0.52 kg (1.15 lb)
Mounting	:TS35 DIN Rail (EN500022).

Connectors

Power	
Connector type	:2 part connector with rising cage clamp screw terminals.
Cable size	:0.14 to 2.5 mm^2 (22 to 12 AWG). .
Inputs/Outputs, Current Loop, Wallbus & AUX (power out).	
Connector type:	:2 part connector (0.2” pitch) with rising cage clamp screw terminals.
Cable size	:0.14 to 2.5 mm^2 (22 to 12 AWG)
I/O Bus	:PCB edge connector for use with: IQ4/IC/LINK rigid interconnector, IQ4/IC/ADPT cable adapter, or IQ4/IC/TERM terminator.
RS232 Supervisor Port	:RJ11 (FCC68).
Ethernet Port	:RJ45 connector.
USB Engineering Port	:Micro B connector.
USB Expansion Port	:USB Type A (for future use)

ENVIRONMENTAL

EMC	:EN61326-1:2013.
Immunity	:Table 2 - for equipment intended for use in industrial locations.
Emissions	:Class B.
Safety	:EN61010-1:2010.
CB certificate	:TBA.
Ambient limits	
Storage	:-25°C (-13°F) to +60°C (+140°F).
Operating	:-25°C (-13°F) to +55°C (+131°F).

Note: For temperatures below 0°C (32°F) special care must be taken that there is no condensation on or within the unit.

Humidity	:0 to 90%RH non-condensing.
Altitude	:<4000 m (13124’).
Pollution Degree	:2 (Only non-conducting pollution occurs).
Protection	:IP20 if mounted in an enclosure rated at IP20 or equivalent.

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Data Sheet

TB/TC, /TI, /TO

Thermistor Temperature Sensors

TB/TC, /TI, /TO Thermistor Temperature

Description

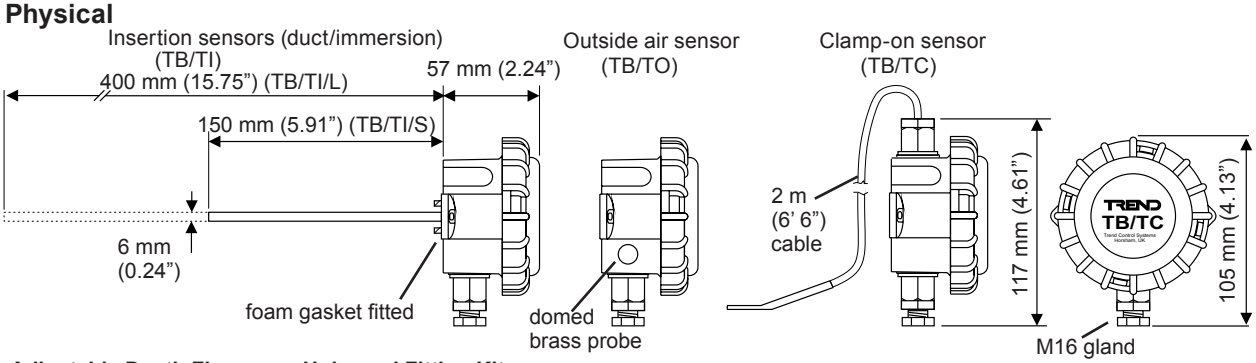
A range of low cost thermistor sensors comprising insertion, clamp-on, and outside air versions. A quick-release lid makes the TB/T.. range easy to install.

The insertion sensor may be used for duct or immersion purposes. It has a 6 mm diameter brass probe which is suitable for retrofit immersion applications and will fit most existing pockets (universal fitting kit option). Brass and stainless steel pockets are available. A foam gasket is fitted, and an adjustable depth flange option is available for its use as a duct sensor, enabling the insertion depth to be adjusted.

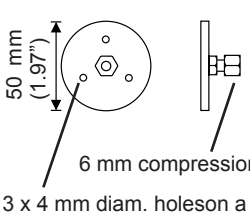
Features

- Low cost
- High quality thermistors
- Brass probes
- M20 conduit entry with M16 cable gland
- IP67 housing
- Quarter turn quick release lid
- Easy to wire
- Universal fitting kit option for retrofit of immersion sensors
- Adjustable insertion depth flange option for duct sensors

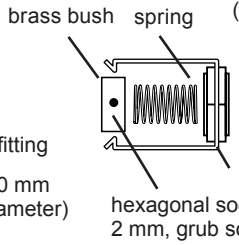
Physical



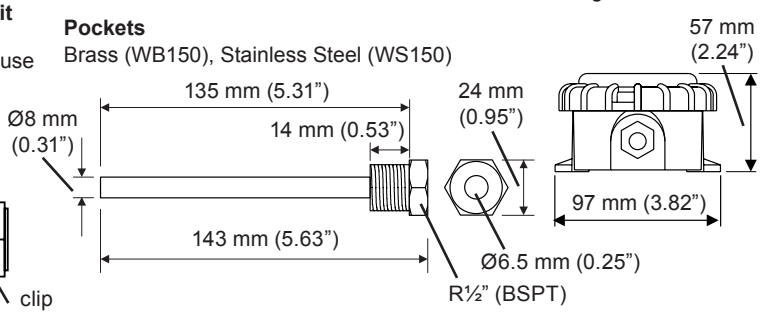
Adjustable Depth Flange (ACC/DF)
adjustable insertion depth for duct sensor use



Universal Fitting Kit (ACC/UF)
for immersion sensor use in existing pockets



Pockets
Brass (WB150), Stainless Steel (WS150)

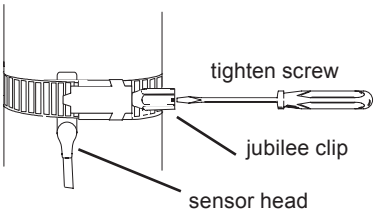


INSTALLATION

TB/TC

Sensor Head

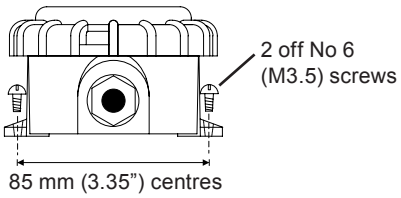
Choose an accessible location for the sensor head, where the element will make good contact with the surface that is to be measured. The probe temperature range is -40 °C to +100 °C (-40 °F to +212 °F). However the sensor's measurement range is -30 °C to +100 °C (-22 °F to +212 °F).



Strap the sensor head to the pipe using the jubilee clip provided. Wrap the clip around the pipe, pass the sensor head under the strap, and tighten the screw (as shown). Ensure that good contact is made between the sensor head and the surface. Where possible use a thermally conductive paste to ensure a good thermal contact and apply any insulation over both sensing element and pipe.

Junction Box

The junction box should be mounted on a flat surface. Choose a position which is a maximum of 2 m (6½') away from the sensor head. The permitted ambient temperature range is -40 °C to +50 °C (-40 °F to +122 °F). Avoid direct contact with steam.



Screw the junction box in position using suitable wall plugs if required and 2 off No. 6 (M3.5) screws, (85 mm, 3.35" fixing centres).

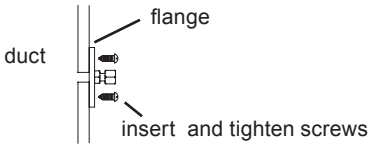
TB/TI

Mechanical

The probe temperature range is -40 °C to +110 °C (-40 °F to +230 °F); the box range is -40 °C to +50 °C (-40 °F to 122 °F). However the sensor's measurement range is -30 °C to +110 °C (-22 °F to +230 °F).

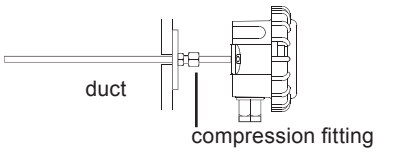
Use as a Duct Sensor

Choose a location where the sensor probe will lie in the airstream to be measured.

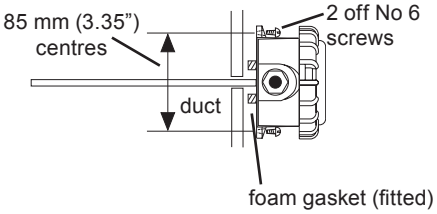


Sensor with optional flange
If the depth of the probe is to be adjusted, then the sensor must be mounted using the optional flange. Drill a 7 mm (0.28") diameter hole in the duct and use the mounting flange to mark the position of the 3 fixing holes. Drill the 3 pilot holes and mount flange with 3 off No. 6 x 3/4 S/S screws.

Insert the sensor probe through the flange into the duct to desired depth and tighten the compression fitting.



Sensor direct onto the duct
If the depth of the probe is not to be adjusted then the sensor can be mounted directly on to the duct. Drill a 7 mm diameter hole in the duct and mark the position of the 2 mounting holes with 85 mm (3.35") mounting centres. Drill 2 pilot holes in the positions marked. Insert the sensor probe into the duct , and screw to the duct with 2 off No. 6 x 3/4 S/S screws.

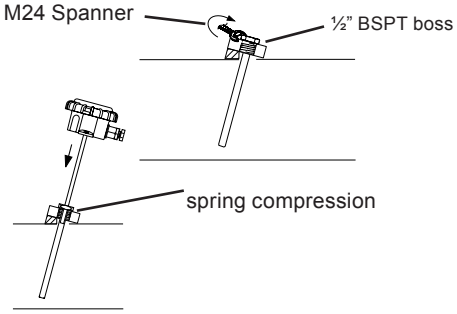


Use as an Immersion Sensor

New Pocket

Choose an accessible location for the sensor pocket where it will lie in the liquid to be measured. Ensure no stratification in the liquid flow being measured (e.g. downstream of mixing valves or junctions). If used for chilled water ensure pocket is sealed around probe or fill pocket with thermally conducting oil to avoid the build up of condensation in bottom of pocket.

Note that the Brass (WB150) and Stainless Steel (WS150) pockets are not suitable for use in a chlorine rich environment.

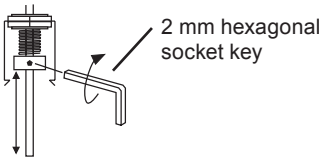


Screw the pocket into a ½" BSPT threaded boss using M24 spanner. Apply sealant to boss thread. If the boss is threaded incorrectly, an adaptor should be used.

Slide sensor probe into pocket against spring compression with the cable entry at the desired angle.

Ensure that the end of the probe is hard against the end of the pocket.

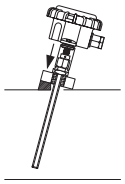
Retrofit to existing pocket



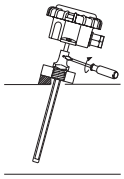
The Universal Fitting Kit enables sensor to be mounted in a number of different pocket types.

Adjust position of brass bush on probe so that probe inserts fully into pocket using 2 mm hexagonal socket key to adjust grub screw.

For pockets with a clip retaining groove simply insert probe into pocket and pull the metal clip over the over the top of the pocket to engage in the groove.



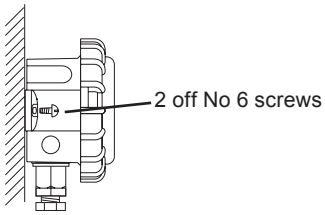
For pockets which hold sensor by a grub screw, tighten pocket grub screw onto brass bush. If necessary, spring and clip can be removed.



TB/TO

Mechanical

Choose an accessible location on a north facing wall (unless in the southern hemisphere), ensuring that the sensor is sited away from direct sunlight, and any heat sources which may come from the building - e.g. heating flues, open windows etc. Do not install the sensor in a location where it will be exposed to temperatures outside the box's temperature range (-40 °C to +50 °C, -40 °F to 122 °F). However the sensor's measurement range is -30 °C to +50 °C (-22 °F to +122 °F).



Mark the position of the 2 mounting holes with 85 mm (3.35") mounting centres. Drill holes in the positions marked. Mount the sensor on the wall using suitable wall plugs and 2 off No 6 screws.

CONNECTIONS

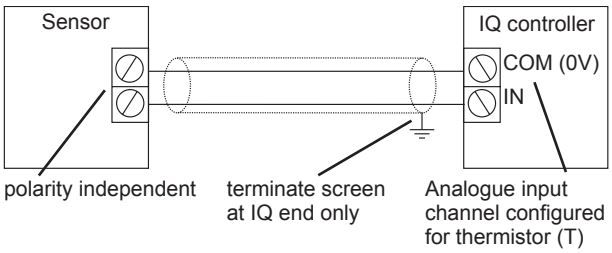
Electrical

Connect to the IQ controller is as below:

(1) Remove quarter turn quick release lid.

(2) Insert cable through cable gland and connect signal wires as shown using either polarity.

(3) The cable screen should be terminated at the controller.



Full installation details are given in the individual installation instructions numbered as follows:

TB/TO Outside Air Thermistor Temperature Sensor Installation Instructions - (TG200725)
TB/TC Clamp-on Thermistor Temperature Sensor Installation Instructions - (TG200726)
TB/TI Insertion Thermistor Temperature Sensor Installation Instructions - (TG200727)

ORDER CODES

TB/TO	Outside Air Thermistor Temperature Sensor
TB/TI/S	Insertion Thermistor Temperature Sensor (for duct or immersion use) with foam gasket fitted (short - 150 mm, 5.91")
TB/TI/L	Insertion Thermistor Temperature Sensor (for duct use) with foam gasket fitted (long - 400 mm, 15.75")
TB/TC	Clamp-on Thermistor Temperature Sensor supplied with jubilee clip
WS150	6 mm stainless steel pocket for TB/TI (immersion use)
WB150	6 mm brass pocket for TB/TI (immersion use)
ACC/UF	Universal fitting kit (retrofit to existing pockets) for TB/TI (immersion use)
ACC/DF	Adjustable depth flange for TB/TI (duct use)
TB/TI-S/BOX12	Pack of 12 TB/TI/S
TB/TI-L/BOX12	Pack of 12 TB/TI/L

DISPOSAL

WEEE Directive :

At the end of their useful life the packaging and product should be disposed of by a suitable recycling centre.

Do not dispose of with normal household waste.

Do not burn.

SPECIFICATIONS

Sensing element :Thermistor 10 kΩ at 25 °C
Thermistor accuracy
- -10 °C to +40 °C :±0.43 °C (14 °F to +104 °F, ±0.77 °F)
- - 30 °C to +50 °C :±0.59 °C (-22 °F to +122 °F, ±1.06 °F)
- - 30 °C to +100 °C :±1.11 °C (-22 °F to +212 °F, ±2.0 °F)
- - 30 °C to +110 °C :±1.28 °C (-22 °F to +230 °F, ±2.30 °F)

Ambient limits
- box :-40 °C to +50 °C (-40 °F to +122 °F)
- /TC probe :-40 °C to +100 °C (-40 °F to +212 °F)
- /TI probe :-40 °C to +110 °C (-40 °F to +230 °F)

Humidity :0 to 95 %RH
Measurement ranges
- /TO :-30 °C to +50 °C (-22 °F to +122 °F)
- /TC :-30 °C to +100 °C (-22 °F to +212 °F)
- /TI :-30 °C to +110 °C (-22 °F to +230 °F)

Cable entry :M20 conduit with M16 cable gland
Connections :1 part screw terminals for 0.5 to 2.5 mm^2 cross section (20 to 14 AWG) cable
Pockets :Spring compression
- WS150 :Maximum pressure 25 bar
- WB150 :Maximum pressure 13 bar

Dimensions
- /TC :57 mm (2.24”) x 117 mm (4.61”) max diameter, cable 2 m (6’6”)
- /TO :57 mm (2.24”) x 102 mm (4.02”) max diameter
- /TI :(box)57 mm (2.24”) x 105 mm (4.13”), /S probe 150 mm (5.91”) x 6 mm (0.24”) /L probe 400 mm (15.75”) x 6 mm (0.24”)

Material
Enclosure :Impact resistant ABS
- /TI, /TO probes :Brass
- /TC probe :Plated copper
- WS150 :pocket, stainless steel
- WB150 :pocket, brass

Environmental Protection:IP67 (NEMA6)
EMC :EN61326-1:2006

Input channels and sensor scaling

For IQ controllers link input channel for thermistor, T, and set up the sensor type scaling; the recommended method of setting the sensor type scaling is to use SET.

For all IQ2 series controllers with firmware of version 2.1 or greater, or IQ3/4 series controllers, one of the following SET Unique Sensor References should be used:

Thermistor TBTO	(-10 °C to +40 °C)
Thermistor TBTO F	(+14°F to +104 °F)
Thermistor TBTC	(-30 °C to +100 °C)
Thermistor TBTC F	(-22°F to +212 °F)
Thermistor TBTI	(-30 °C to +110 °C)
Thermistor TBTI F	(-22°F to +230 °F)

Alternatively use sensor scaling mode 5, characterise, and enter the scaling manually as defined in the tables below. Note that for IQ3/4 the scaling mode and exponent (E) don’t need to be set up.

-30 °C to +110 °C
(-22 °F to +230 °F)

Units:		°C	°F
Y	Input type	1 (therm V)	
E	Exponent	3	
U	Upper	115	239
L	Lower	-35	-31
P	Points	20	
x	Ix	Ox	
1	0.480	110	230
2	0.549	105	220
3	0.630	100	212
4	0.724	95	203
5	0.833	9	194
6	0.961	85	185
7	1.110	80	176
8	1.484	70	158
9	1.985	60	140
10	2.641	50	122
11	3.470	40	104
12	4.460	30	86
13	6.663	10	50
14	7.668	0	32
15	8.102	-5	23
16	8.482	-10	14
17	8.807	-15	5
18	9.078	-20	-4
19	9.299	-25	-13
20	9.476	-30	-22

-30 °C to +100 °C
(-22 °F to +212 °F)

Units:		°C	°F
Y	Input type	1 (therm V)	
E	Exponent	3	
U	Upper	105	221
L	Lower	-35	-31
P	Points	18	
x	Ix	Ox	
1	0.630	100	212
2	0.724	95	203
3	0.833	90	194
4	0.961	85	185
5	1.110	80	176
6	1.484	70	158
7	1.985	60	140
8	2.641	50	122
9	3.470	40	104
10	4.460	30	86
11	6.663	10	50
12	7.668	0	32
13	8.102	-5	23
14	8.482	-10	14
15	8.807	-15	5
16	9.078	-20	-4
17	9.299	-25	-13
18	9.476	-30	-22

-30 °C to +50 °C
(-22 °F to +122 °F)

Units:		°C	°F
Y	Input type	1 (therm V)	
E	Exponent	3	
U	Upper	55	131
L	Lower	-35	-31
P	Points	11	
x	Ix	Ox	
1	2.641	50	122
2	3.470	40	104
3	4.460	30	86
4	6.663	10	50
5	7.668	0	32
6	8.102	-5	23
7	8.482	-10	14
8	8.807	-15	5
9	9.078	-20	-4
10	9.299	-25	-13
11	9.476	-30	-22

-10 °C to +40 °C
(14 °F to +104 °F)

Units:		°C	°F
Y	Input type	1 (therm V)	
E	Exponent	3	
U	Upper	45	113
L	Lower	-15	-5
P	Points	6	
x	Ix	Ox	
1	3.470	40	104
2	4.460	30	86
3	6.663	10	50
4	7.668	0	32
5	8.102	-5	23
6	8.482	-10	14

For all other IQ controllers see the Sensor Scaling Reference Card, TB100521A.

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INSTALLATION

Observe local codes of practice e.g. use of CORGI registered installers.

Multifunctional controls with bypass jet: ensure jet is drilled to correct size and screw into hole in control body, accessible through outlet port.

Ensure gas supply is switched off prior to installation. Connecting pipework to be clean. Noting direction of flow as shown by arrow on valve body, mount control into pipework using thread sealant.

Mounting orientation is universal provided valve solenoid is in upper hemisphere.

Auxillary e.g. pilot connections may be made to body tappings as appropriate to control.

Ensure electrical supply is m.c.b. protected or fitted with a slow blow fuse rated marginally above maximum power requirement (see specifications).

Solenoid coils may be rotated as required; make electrical connection as follows:

Models with flying lead:
Brown = LIVE,
Blue = NEUTRAL
Green/yellow = EARTH
Models with tab terminals / DIN connector, view on coil:
Right tab = LIVE,
Left tab = NEUTRAL
Top (big) tab = EARTH

COMMISSIONING

Leak test gas connections. Switch on gas supply. Test points (where fitted) may be used to establish static pressure of gas supply. Control ready for service.
Multifunctional controls: energise valves and adjust flow restrictor/governor as required to achieve desired burner pressure.

ACCESSORIES

POWERLINK

BC66MRF Manually Resettable Thermal Fuse

BC66ETF Electro-Thermal Fuse

POWERSEV

Powersev Switches

THERMAL FUSES

Remote mounted thermally operated thermal fuses in vented metal housings. Wired in series with a Safety Shut-off Valve the fuse will open a circuit at a pre-determined temperature interupting the supply to the valve, which will then close.

BC66MRF Manually Resettable Thermal Fuse

Electrical Rating - SPCO, %A max, 230V AC

Fusing Temperature from 70°C; 10°reset differential

BC66ETF Electro-Thermal Fuse - non-resettable, fuse is replaced after operation

Electrical rating - 15A max. 230V AC

Fusing Temperature 72°C standard, others available

EMERGENCY CUT-OUT SWITCHES

Remote mounted 'push-to-break contact' - 'twist to re-set' switch for emergency use. Available in metal or plastic wall mounted box, with or without keyswitch operation.

Product Codes	Metal box:-	BC66ESB
	Plastic Box:-	BC66ESB/P
	Key Switch Op.:-	BC66ESB/K
Contacts	10A 500V max. single pole	
Temp. Range	-25° C to +70° C	
Protection	BC66ESB - IP65, others IP40	

Other contact blocks for 3 phase, double pole or normally open contacts available for retro fitting

BLACK TEKNIGAS
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Black Teknigas has a policy of continuous research and development and reserve the right to change specification without prior notice. Doc Ref CAT 004/B

Honeywell

VE Series

Class "A" Gas Valves

Product handbook

APPLICATION

These series class A gas valves are used for control and regulation of gaseous fluids in gas power burners, atmospheric gas boilers, melting furnaces, incinerators and other gas consuming appliances.

CONTENTS

DESCRIPTION

The VE series gas valves offer a series of functionalities:

- Gas valves, Normaly Closed, consisting of a direct ON/OFF operator for opening/closing of the valve.
- Gas valves for use with Honeywell V4055, V4062 and V9055 fluid power actuators.
- Relief valves with or without position indication switch, Normaly Open, consisting of direct electric ON/OFF operator for opening/closing of the valve.

The VE series gas valves are suitable for the control of gaseous fluids in gas consuming appliances according to international standards.

The VE series gas valves meet the class A specification according EN 161.

The VE series gas valves cover a wide range of pipe sizes from $^3/_8$" (DN 10) up to and including 3" (DN 80).

The VE series gas valves have threaded connections from $^3/_8$" (DN 10) up to and including $2^1/_2$" (DN 65).

The VE series gas valves with pipe sizes $2^1/_2$" (DN 65) and 4" (DN 100) have flange connection.

The VE series gas valves $^3/_8$" (DN 10) and $^1/_2$" (DN 15) have an maximum supply pressure of 350 mbar.

The VE series gas valves $^3/_4$" (DN 20) up to and including 4" (DN 100) have an maximum supply pressure of 200 mbar or 360mbar on request.

The VE series gas valves have test points for inlet and outlet gas pressure. The VE series gas valves have an inlet screen for protecting the valve against ingress of dirt.

FEATURES

- Class A valve for control of gas consuming appliances.
- The VE....X series gas valves except VE....S series have a spring loaded valve disc, closed when de--energized.
- The VE....S series gas valves have a spring loaded valve disc, opened when de--energized.
- Incorporating time proven design concepts assuring reliability.
- All VE.... series gas valves have an internal fine mesh screen.
- Two R$^1/_4$" connections for inlet pressure at each side of the electro magnetic gas valve.
- The VE....X 1... series gas valves have a wrench boss as well on inlet side as on outlet side for pipe fitting incorporated in the valve housing.
- The VE.... series gas valves may be assembled on the pipe linewith in plus or minus 90 degrees of the vertical axel.
- The VE....X 3... series gas valves (flange connection) have two ($^1/_4$") inlet pressure taps and two $^1/_4$") outlet pressure taps at either side.
- The VE....X 3... and VE5...X 3... series gas valves have at inlet side two 1" ISO 7--1 connection taps.
- The VE....X 3... and VE5...X 3... series gas valves are equiped at both sides with mounting holes to adapt a pilot solenoid valve combination, to allow either internal or external pilot gas. Futhermore these valves are equiped with two M6 mounting holes to adapt an A4020A electronic leak test controller (see dimensional drawing page 11).
- The VE ....B series gas valves have an adjustable flow rate regulator on top of the coil.
- The VE series gas valves have a field replaceble coil.
- The VE series gas valves have a field replaceble rectifier board.
- The VE ....C series gas valves have adjustment for:
  step pressure
  flow rate and
  opening speed on top of the coil.
- The VE....S series gas valves normaly open relief valves are equiped with or without a position indication switch.
- The VE5...X 3... series gas valves can be equiped with a wide range of Honeywell fluid power actuators. These fluid power actuators are field replaceable.
- The VE series solenoid gas valves have electrical connection by terminal block with incorporated rectifier board.
- The VE series solenoid gas valves have coils turnable over 360°.
- Cable strain relief can be achieved by PG 11 cable gland.
- The VE series gas valves cover a wide range of pipe sizes from DN 10 up to and including DN 80.

Electrical connection

- Supply voltages 24, 110, 220 and 240V 50/60 Hz.
- Electrical enclosure according to IP 54 unless other specification.
- Electrical enclosure VE....S 1... series gas valves with switch according to IP 50

MODEL CHART

Options			1000 series (internal threaded)	3000 series (flange connection)
Range:	DN 10	3/8"	VE..10	--
	DN 15	1/2"	VE..15	--
	DN 20	3/4"	VE..20	--
	DN 25	1"	VE..25	--
	DN 32	1 1/4"	VE..32	--
	DN 40	1 1/2"	VE..40	--
	DN 50	2"	VE..050	--
	DN 65	2 1/2"	VE..65	VE..65
	DN 80	3"	VE..80	VE..80
	DN 100	4"	VE..100	VE..100
Non regulated ON/OFF (VE....A XXXX)			Standard	Optional
Flow regulator (VE....B XXXX)			Optional	Standard
Adjustable opening and flow regulator (VE....C XXXX)			Optional [1])	Not available
Motorised opening: ON/OFF (VE5...A XXXX)			Not available	VE5065A 3xxx VE5085A 3xxx
Motorised opening: characterized (VE5...C XXXX)			Not available	VE5065C 3xxx VE5085C 3xxx
Safety relief valve, ON/OFF, Normally Open, with or without position indication switch (VE....S XXXX)			Optional for: VE..20 VE..25	Not available

[1])Except VE..65/VE..80

SPECIFICATIONS

Models

The VE series consists of solenoid gas valves series and gas valves suitable for combining with Honeywell V4055, V4062 and V9055 fluid power actuators.

VE series solenoid gas valves

VE..10 (DN 10)
VE..15 (DN 15)
VE..20 (DN 20)
VE..25 (DN 25)
VE..32 (DN 32)
VE..40 (DN 40)
VE..50 (DN 50)
VE..65 (DN 65)
VE..80 (DN 80)
VE..100 (DN 100)

VE series suitable for fluid power actuators

VE5065 (DN 65)
VE5080 (DN 80)

Pipe sizes 1000 series

Inlet and outlet $^3/_8$" up to $2^1/_2$" internal parallel pipe thread according to ISO 7--1

Pipe sizes 3000 series

Flanged connection DN 65 and DN 80 according to DN 16 UNI 2223.

Torsion and bending stress

Pipe connections meet Group 2 according EN 161 requirements.

Ambient temperature

--15 °C ... 60 °C

Supply voltage

24 V, 50/60 Hz
110 V, 50/60 Hz
220 V, 50/60 Hz
240 V, 50/60 Hz

The applicable voltage is led to the solenoid coil via a rectified circuit.

Dimensions

1000 series: See page 10
3000 series: See page 11

Electrical connection

Wiring on terminal block on box Cable entry Pg 11.

Coil insulation solenoid valves

Insulation material according class F

Enclosure

IP 54 unless otherwise specified
IP 50 for VE4...S 1... series with position indication switch
IP 65 on request

Capacity

See page 8 and 9

Maximum operating pressure

Model	Maximum operating pressure (mbar)
VE..10	360
VE..15	360
VE..20	200 or 360
VE..25	200 or 360
VE..32	200 or 360
VE..40	200 or 360
VE..50	200 or 360
VE..65	200 or 360
VE..80	200 or 360
VE5065	200 or 360
VE5080	200 or 360
VE..100	200 or 360

Power Consumption Version A - 200 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..10A	20	24	18	22	17	21	14	17	14	17
VE..15A	20	24	18	22	17	21	14	17	14	17
VE..20A	30	36	21	25	24	29	21	25	20	24
VE..25A	30	36	21	25	24	29	21	25	20	24
VE..32A			53	64	67	81	47	57	40	48
VE..40A			53	64	67	81	47	57	40	48
VE..50A			49	59	64	77	48	58	41	50
VE..65A							72	87	83	100
VE..80A							71	86	85	103
VE..100A start									162	196
VE..100A work							163	197	41	50

Power Consumption Version A - 360 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..10A			18	22	17	21	14	17	14	17
VE..15A			18	22	17	21	14	17	14	17
VE..20A							21	25	20	24
VE..25A							21	25	20	24
VE..32A							48	58	41	50
VE..40A							48	58	41	50
VE..50A							63	76	60	73
VE..65A								0		0
VE..80A start							248	300	287	347
VE..80A work							62	75	70	85
VE..100A start							218	264	612	741
VE..100A work							55	67	153	185

Power Consumption Version B, C - 200 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..10B,C			18	22	17	21	14	17	14	17
VE..15B,C			18	22	17	21	14	17	14	17
VE..20B,C			21	25	24	29	21	25	20	24
VE..25B,C			21	25	24	29	21	25	20	24
VE..32B,C			53	64	67	81	47	57	40	48
VE..40B,C			53	64	67	81	47	57	40	48
VE..50B,C			49	59	64	77	48	58	41	50
VE..65B							71	86	62	75
VE..80B							71	86	85	103
VE..100B start									162	196
VE..100B work							163	197	41	50

Power Consumption Version B, C - 360 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..10B,C			18	22	17	21	14	17	14	17
VE..15B,C			18	22	17	21	14	17	14	17
VE..20B,d							21	25	20	24
VE..25B,C							21	25	20	24
VE..32B,C							48	58	41	50
VE..40B,C							48	58	41	50
VE..50B,C							63	76	60	73
VE..65B							162	196	83	100
VE..80B start							248	300	287	347
VE..80B work							62	75	70	85
VE..100B start							218	264	612	741
VE..100B work							55	67	153	185

Power Consumption Version S - 200 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..20S			16	19	17	21	14	17	16	19

Power Consumption Version S - 360 mbar

Model number	12 Volt, 50/60Hz nominal	12 Volt, 50/60Hz 110% of nominal	24Volt, 50/60Hz nominal	24 Volt, 50/60Hz 110% of nominal	24 Volt (dc), nominal	24 Volt (dc), 110% of nominal	110 Volt, 50/60Hz nominal	110 Volt, 50/60Hz 110% of nominal	220 Volt, 50/60Hz nominal	220 Volt, 50/60Hz 110% of nominal
VE..20S			16	19	17	21	14	17	16	19

PERFORMANCE CHARACTERISTICS

Maximum allowable leakage

Valve size	Test pressure 1 (mbar)	Test pressure 2 (mbar)	Maximun allowable leakage rate	
			Internal leakage (cm^3/h)	External leakage (cm^3/h)
DN 10	6	525	40	40
DN 15	6	525	40	40
DN 20	6	300	40	40
DN 25	6	300	60	60
DN 32	6	300	60	60
DN 40	6	300	60	60
DN 50	6	300	60	60
DN 65	6	300	60	60
DN 80	6	300	60	60
DN 100	6	300	60	60

Opening time (except VE5... series)

A,B,S version: less than 1 second

C version: adjustable from 1 up to 30 seconds at rated capacity

The opening characteristic is factory set at approx 6 seconds at the following conditions:

- measured at 80 % of rated capacity
- 30 mbar supply pressure
- nominal voltage
- 20 °C
- 2.5 mbar pressure drop
- no step pressure

Due to the influence of ambient temperature (-15 ... 60 °C) the adjusted opening time of 6 seconds measured at 80% of adjusted flow rate can vary +/- 4 seconds.

D,E version: 5 or 30 seconds (depending of actuator)

Closing time VE....A, B, C and S series (except VE5... series)

Less than 1 second

Maximum working frequency

A,B,S version: 20 cycles per minute

C version: 1 cycle per minute

VE5... series: 1 cycle per 2 minutes

Duty cycle

Coil suitable for permanent energization

Operational voltage range

The gas valve will funtion satisfactory between 85% and 110% of the rated voltage.

Rated voltage:

24 V, 50/60 Hz
115 V, 50/60 Hz
230 V, 50/60 Hz

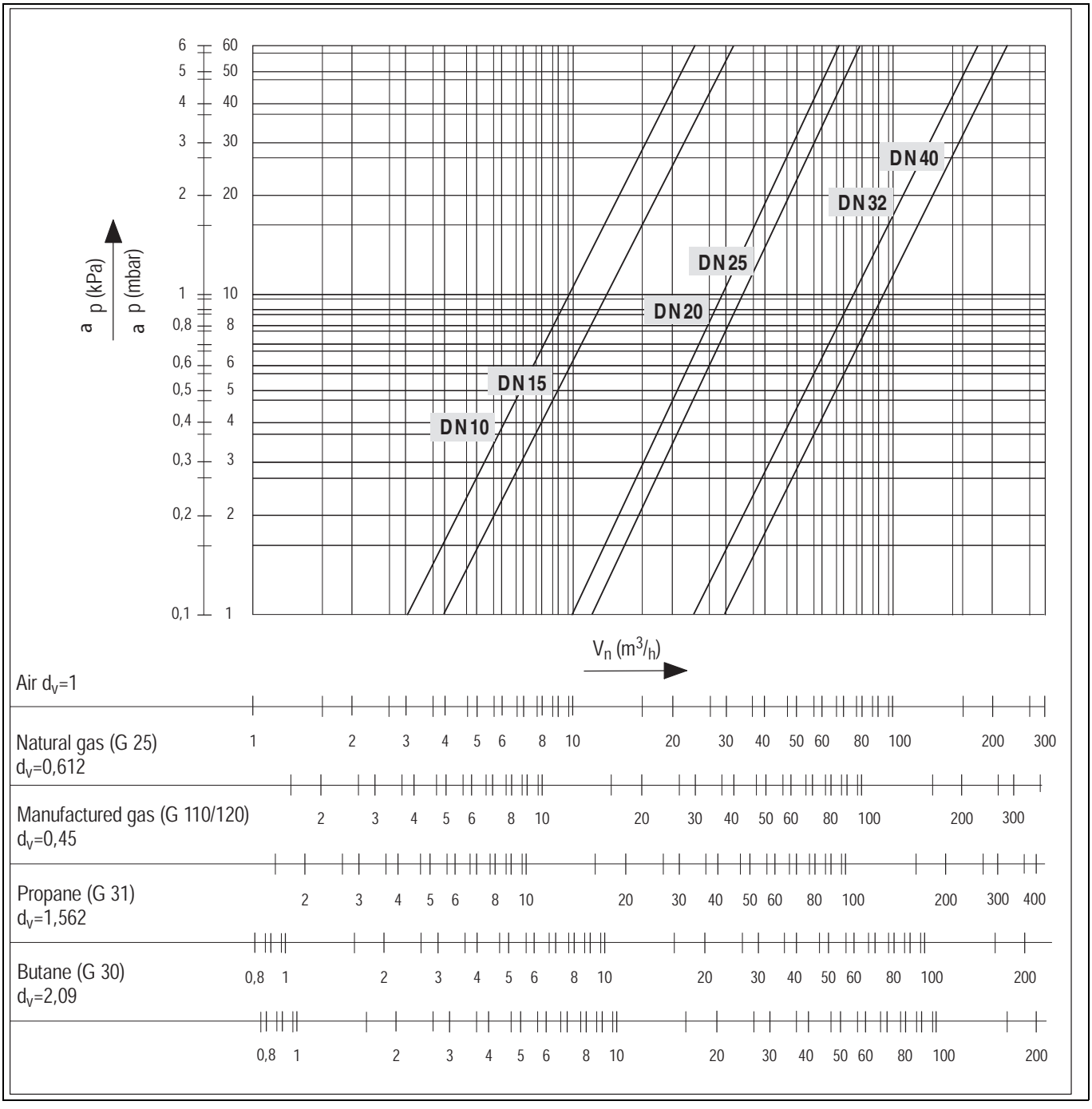
Design life

Model	Number of cycles
VE..10	200.000
VE..15	200.000
VE..20	200.000
VE..25	200.000
VE..32	100.000
VE..40	100.000
VE..50	100.000
VE..65	100.000
VE..80	100.000
VE..100	100.000
VE5065	100.000
VE5080	100.000

CAPACITY CURVE DN 10, DN 15, DN 20, DN 25, DN 32 AND DN 40 (THREADED CONNECTION)

Capacity in m^3/h air at Δp = 2.5 mbar

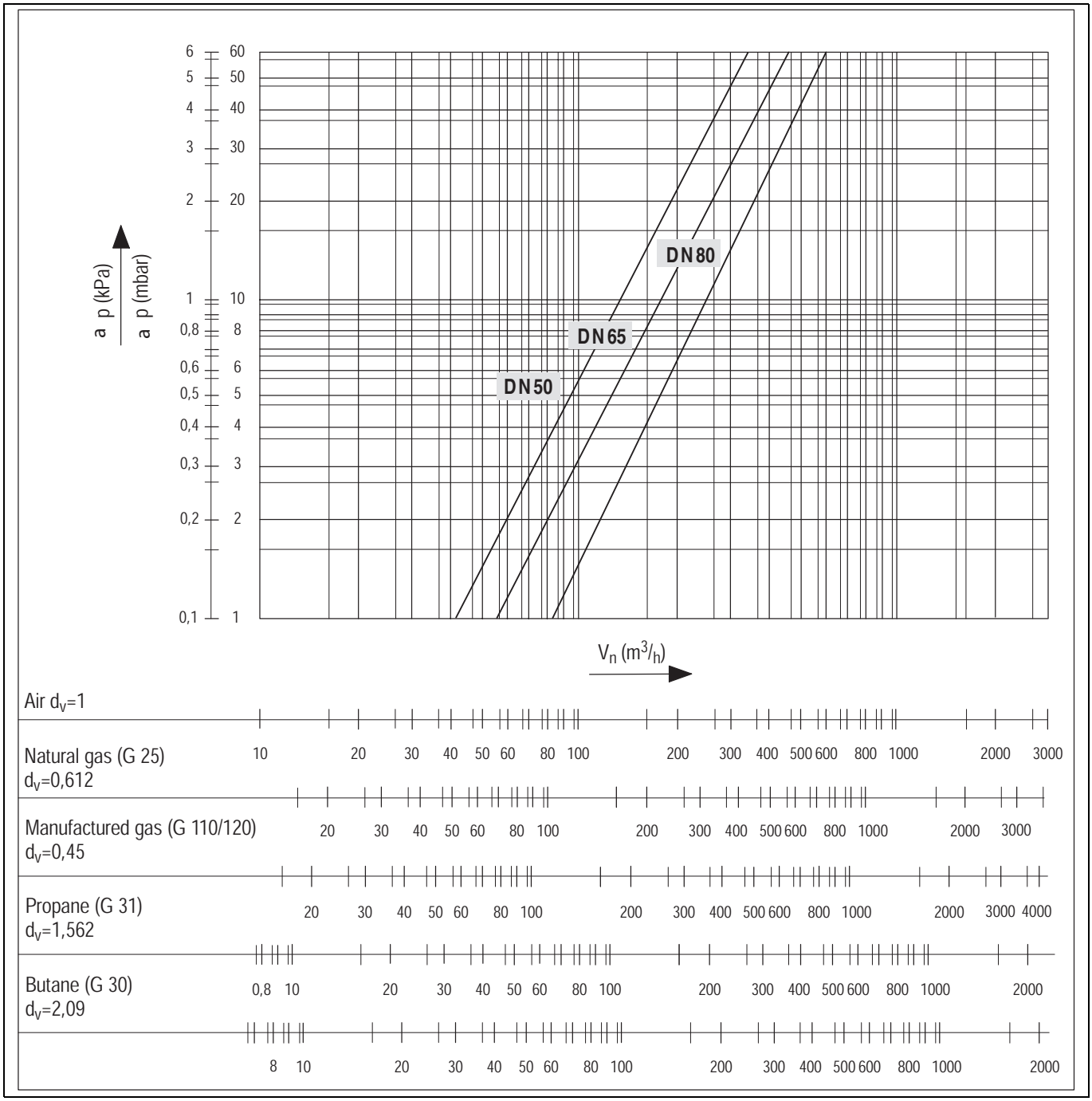
3/8" DN 10	1/2" DN 15	3/4" DN 20	1" DN 25	1 1/4" DN 32	1 1/2" DN 40
5	6.4	14.8	16.7	38.5	47.1



CAPACITY CURVE DN 50, DN 65 AND DN 80 (TREADED AND FLANGED CONNECTION)

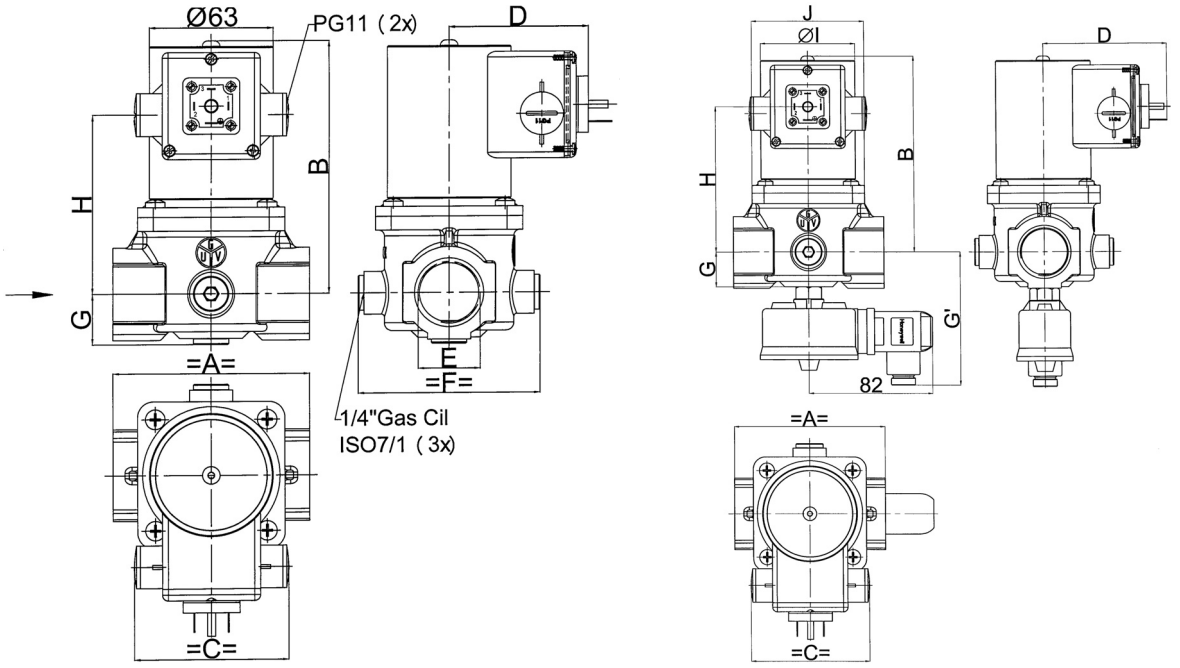
Capacity in m^3/h air at Δp = 2.5 mbar

2" DN 50	$2^1/_2$" DN 15	3" DN 20	4“ DN 100
66.7	94.2	131	225



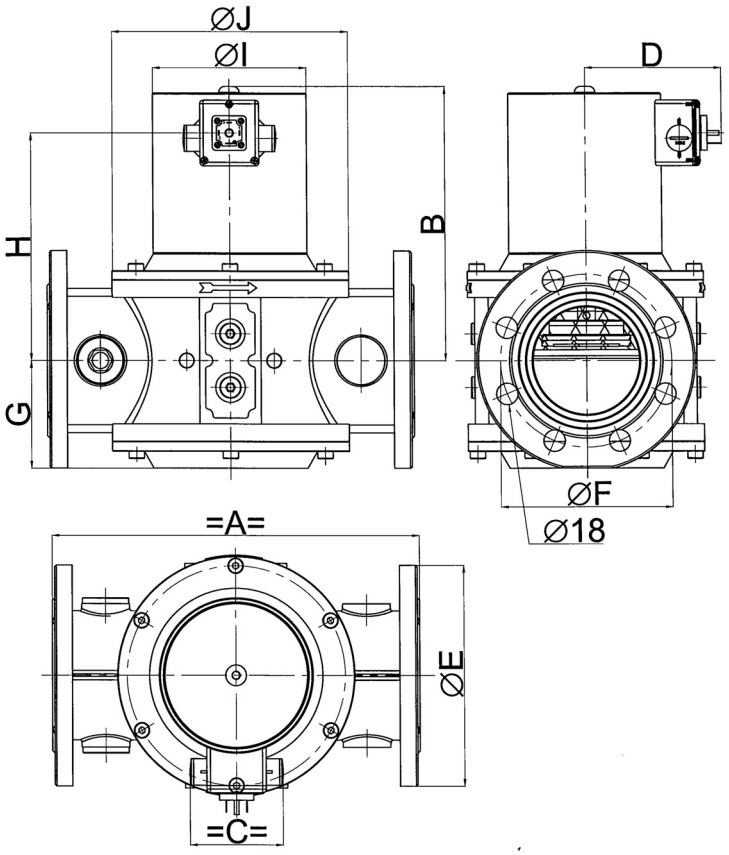
DIMENSIONAL DRAWING 1000 SERIES

With switch

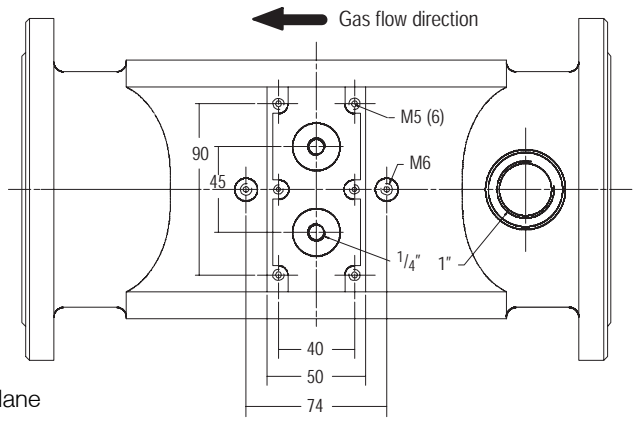


Model	Connection	Dimensions (mm)							Weight (kg)
		A	B	C	D	E	F	G	
VE..10A	DN 10	64.5	100	55	67	70.5	62.5	15	1.1
VE..10B			119						1.1
VE..10C			153						1.2
VE..15A	DN 15	64.5	100	55	67	70.5	62.5	15	1.1
VE..15A			119						1.1
VE..15C			153						1.2
VE..20A	DN 20	86.5	132	63	71	81	93	24	1.9
VE..20B			151						1.9
VE..20C			185						2.3
VE..25A	DN 25	100	132	63	71	92.5	93	24	2.0
VE..25B			151						2.0
VE..25C			185						2.4
VE..32A	DN 32	150	180	95	86	113.5	150	33	5.8
VE..32B			199						5.8
VE..32C			233						6.1
VE..40A	DN 40	150	180	95	86	113.5	150	33	5.8
VE..40B			199						5.8
VE..40C			233						6.1
VE..50A	DN 50	170	199	95	86	138.5	159	41	6.4
VE..50B			218						6.4
VE..50C			252						6.7
VE..65A	DN 65	170	246	130	104	171	203	55	13.0
VE..65B			-						-
VE..65C			-						-

DIMENSIONAL DRAWING 3000 SERIES



Model	Connection	Dimensions (mm)											Weight (kg)
		A	B	C	D	E	F	G	H	J	K	L(-)	
VE..65A3xxx	DN 65	310	230	Ø130	98	200	187	90	79	185	1456	4	15
VE..65B3xxx			250										
VE..80A3xxx	DN 80	310	230	Ø130	120	200	180	91	92	200	160	8	15
VE..80B3xxx			250										
VE..100A3xxx	DN 100	350	280	Ø159	135	252	226	103	92	206	180	8	20
VE..100B3xxx			300										
VE..5065A3xxx	DN 65	310	338	172x127	-	200	-	90	-	185	145	4	10
VE5065C3xxx													
VE5080A3xxx	DN 80	310	338	172x127	-	200	-	91	-	200	160	8	10
VE5080C3xxx													
VE50100A3xxx	DN 100	350	345	172x127	-	252	-	103	-	206	180	8	15
VE50100C3xxx													



Legenda:
Both sides have same pattern
Mounting holes are in the same plane

INSTALLATION

Warning

- Take care that installer is a trained experienced service man.
- Turn off gas supply before starting installation.
- Disconnect power supply to prevent electrical shock and/or equipment damage.

Mounting position

The gas valve can be mounted plus or minus 90 degrees from the vertical.

Mounting location

The distance between the gas valve and the wall/ground, must be at least 30 cm.

Warning

- The outlet of a pressure relief valve (VE4000S series) must always be connected to open atmosphere.

Main gas connection threaded valves

- Take care that dirt cannot enter the gas valve during handling.
- Ensure the gas flows in the same direction as the arrow on the housing of the gas valve.
- Use a sound taper fitting with thread according to ISO 7--1 (BS 21, DIN2999) or a piece of new, properly reamed pipe, free from swarf.
- Do not thread or tighten the pipe or pipe fitting too far. Otherwise valve distortion and malfunction could result.
- Apply a moderate amount of good quality thread compound to the pipe or fitting only, leaving the two end threads bare. PTFE tape may be used as an alternative.
- In order to tighten the pipe in the valve, do not use the actuator as a lever but use a suitable wrench operating on the wrench bosses.

Main gas connection flanged valves

- Take care that dirt cannot enter the gas valve during handling.
- Ensure the gas flows in the same direction as the arrow on the housing of the gas valve.
- Ensure that inlet and outlet flanges are in line and separated from each other enough to allow the valve to be mounted between them without damaging the gasket.
- Place gasket. If necessary grease it slightly to keep it in place.
- Mount gas valve between flanges using the bolts for each flange.

Warning

Tightness test after installation

- Paint all pipe connections and gaskets with a strong soap and water solution.
- Start the appliance and check for bubbles. If a leak is found in a pipe connection, remake the joint. A gasket leak can usually be stopped by tightening the mounting screws. Otherwise, replace the gas valve.

Electrical connection

Caution

- Switch off power supply before making electrical connections.
- Take care that wiring is in accordance with local regulations.

Use lead wire which can withstand 105 °C ambient.

The electric on/off operator is provided with a terminal block for electrical connections.

Wiring

Follow the instructions supplied by the appliance manufacturer.

ADJUSTMENTS AND FINAL CHECKOUT

Warning

Adjustments must be made by qualified persons only.

Caution

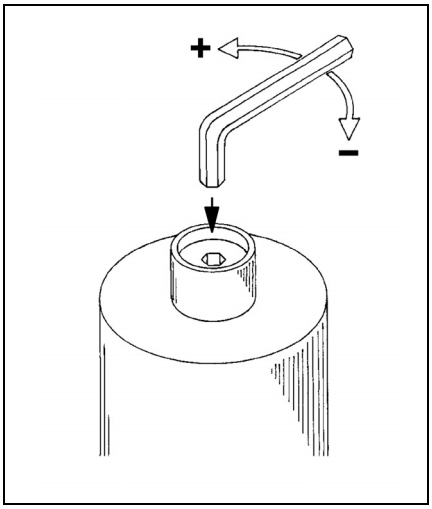
To ensure a safe closing of the valves, it is essential that voltage over the terminals of operators is reduced to 0 Volt.

VE.... B SERIES

(see fig 1.)

Flow rate adjustment

- Remove the cap screw from top of the coil.
- Place a socket head wrench into the adjustment nut.
- Turn wrench counter--clockwise to increase or clockwise to decrease flow rate.
- Replace cap screw.



VE.... C SERIES

(see fig. 2 and 3)

The following characteristics can be adjusted:

- **flow rate**
- **step pressure**
- **opening speed**

Important

To ensure a satisfactory setting of the valve the pressure drop over the valve should be at least 10% of the supply pressure or 2.5 mbar which ever is the greatest.

Flow rate adjustment

- Remove the cap from top of the coil by loosening both screws.
- Place a wrench on the adjustment hexagon nut.
- Turn wrench counter--clockwise to increase or clockwise to decrease the flow rate.
- Replace cap on top of the coil.

Step pressure adjustment

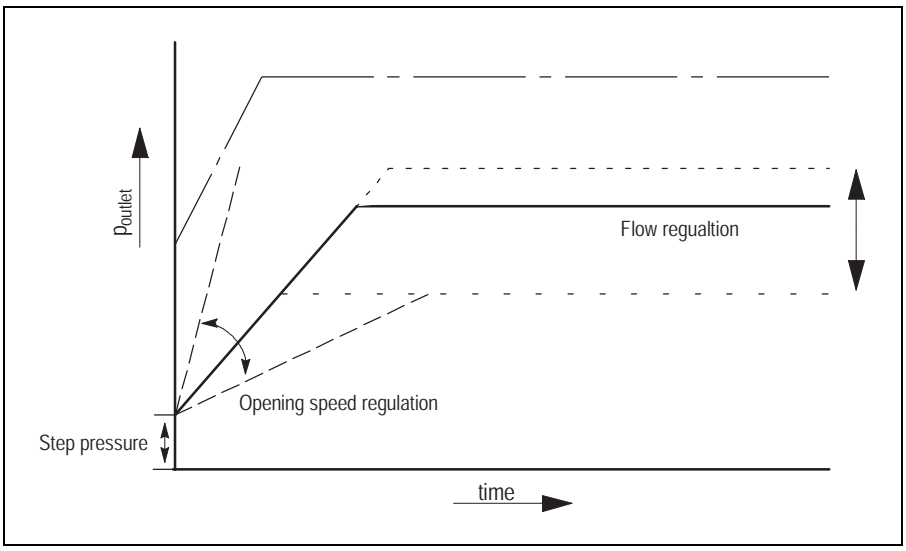
- Remove the cap from top of the coil by loosening both screws.
- Place a screw driver in the slot of adjustment screw which is situtuated in center of the valve.
- Turn screw driver counter--clockwise to increase or clockwise to decrease step pressure.
- Replace cap on top of the coil.

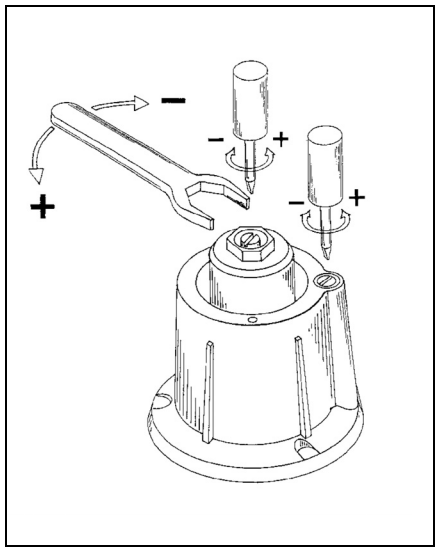
Opening speed adjustment

- Remove the cap from top of the coil by loosening both screws.
- Place screw driver in the slot of adjustment screw which is of center line.
- Turn screw driver counter--clockwise to increase the opening speed and therefore the time till full opening will decrease.
- Turn screw driver clockwise to decrease the opening speed and therefore the time till full opening will increase.
- Replace cap on top of the coil.

Final checkout of the installation

Set appliance in operation after any adjustment and observe several complete cycles to ensure that all burner components function correctly.





CONSTRUCTION AND WORKING PRINCIPLES

The VE Normaly Closed series gas valves are Class A fail safe shutt--off valves.

The valve is opened by energizing the direct ON/OFF operator.

The direct ON/OFF operator consists of a coil and stop sleeve assy. Inside the top sleeve assy is a plunger which is able to move up and down and thus opening or closing the valve.

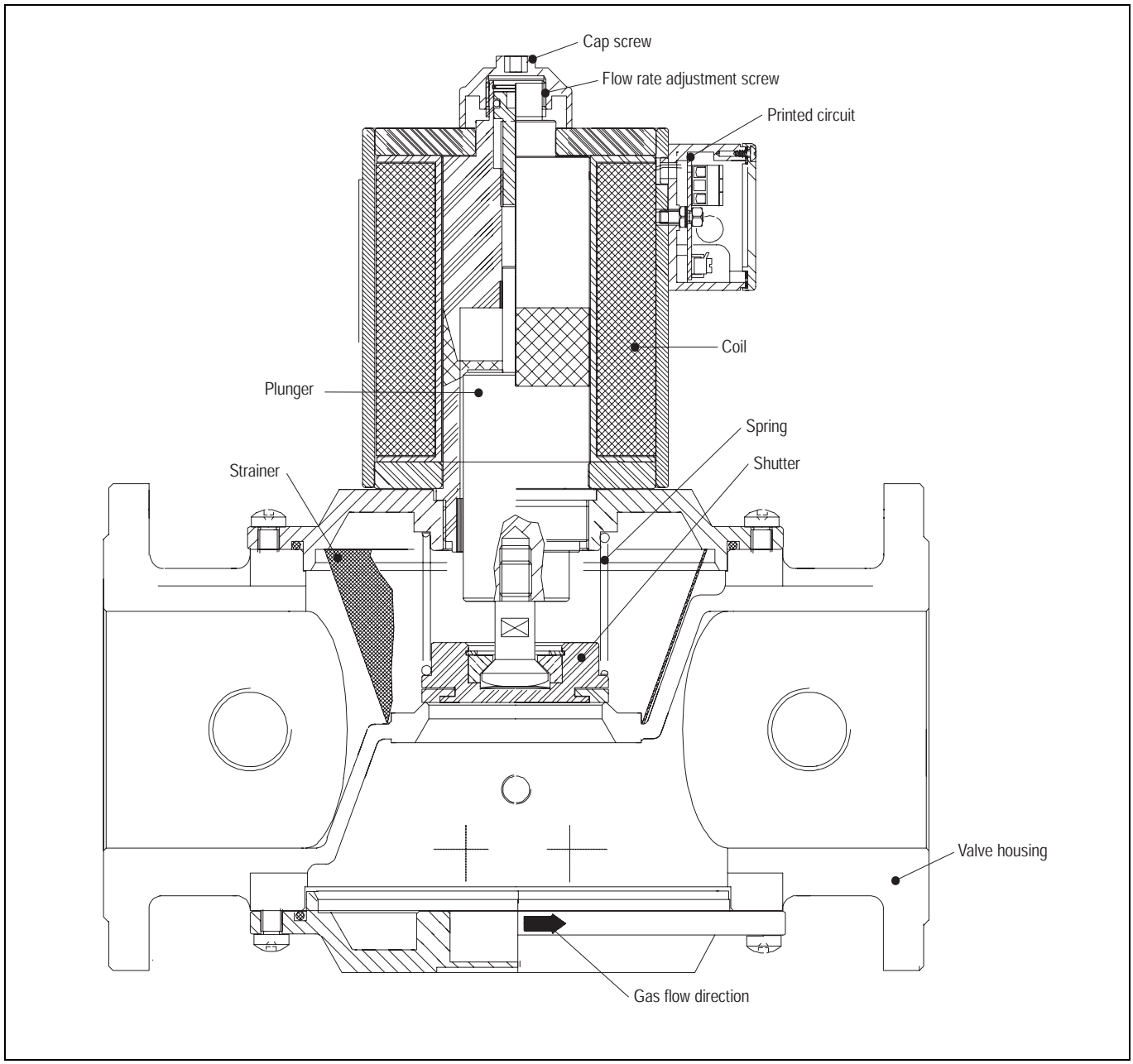
The plunger is gliding on two antifriction bearings.

Flow regulation is done by adjustable plunger stroke.

A strainer made out of steel AISI 303 is incorporated in the gas valve.

Valve closing spring is made out of steel AISI 302.

Seals and gaskets are manufactured out of hydrocarbon resistant NBR according to DIN 3535 and EN 291.



STANDARDS AND APPROVALS

Standards

The VE series gas valves have been designed to meet the European Standard EN 161.

The safety shut off valve meets class A requirements.

According to bending stress the gas valve meets the highest requirements.

Regarding electric safety, the VE series gas valves can be used in appliances according to European Standard for a household electrical requirements EN 60335 series and industrial appli cations.

The VE series gas valves also meet all Electro Magnetic Compatability standadrs for non--industrial and industrial appliances.

Approvals

The VE series gas valves confirm with the following EC--directives:

- Gas Appliance Directive (90/396/EEC)
- Low Voltage directive (73/23/EEC)

The fact that the VE series gas valves are certified to European Standard EN161 means that this series meets more stringent requirements than laid down in the essential requirements stated in the directives and therefore meets the requirements in all EC and EFTA countries.

Details can be found in the approvals list. In addition our controls have been certified by DIN--DVGWin Germany.

The registration number specific for each O.S. number is mentioned on the label of the control.

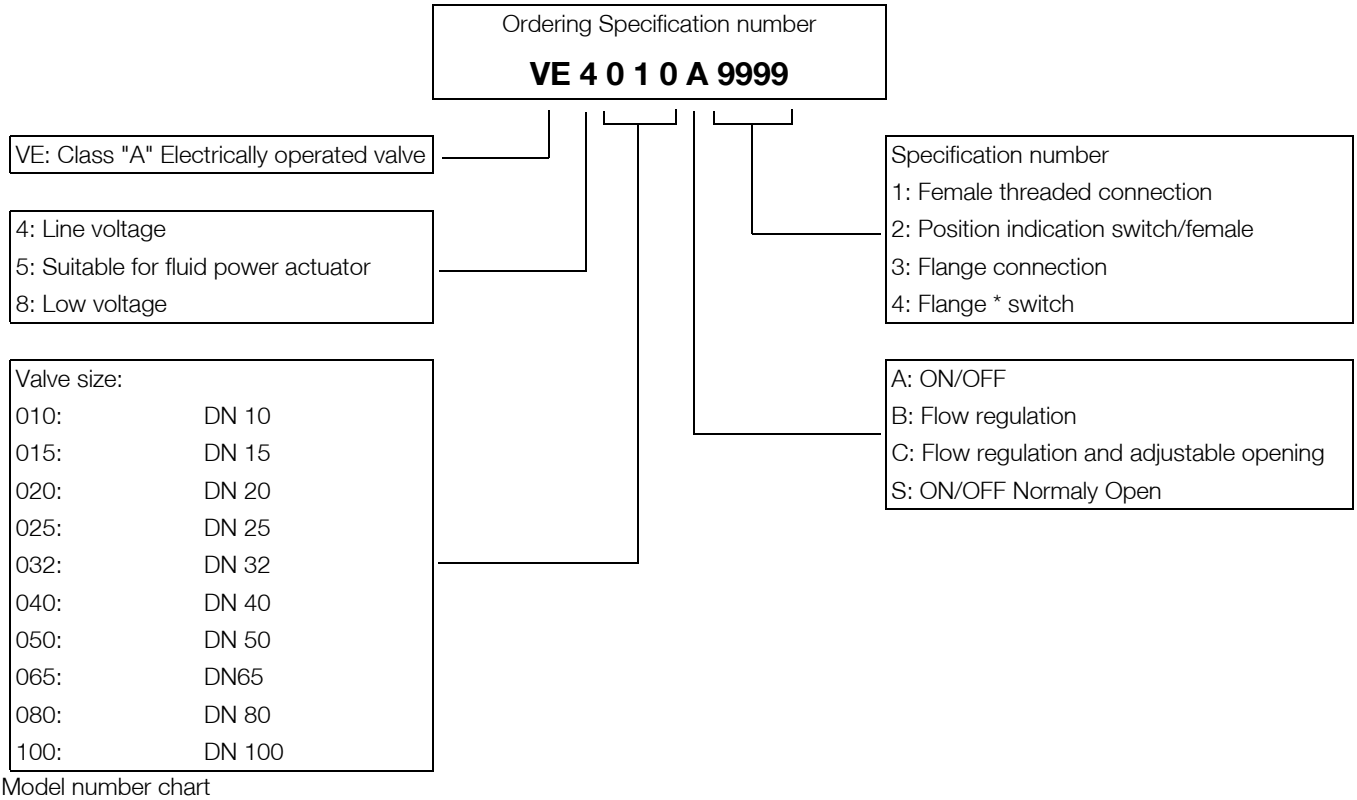
ORDERING INFORMATION

When ordering specify:

- Model number of VE series gas valve required: see model number chart below.
- Order numbers of replacement parts and accessories required, i.e. flanges, compression fittings: see replacement parts/ accessoiries.

Note

Most models of valves, replacement parts and accessories will be available under "TRADELINE" label. Ask your wholesaler for details.



Model number chart

REPLACEMENT PARTS AND ACCESSORIES

Warning

Take care that only qualified persons carry out the installation of parts, accessories, and add on components.

Follow the installation instructions included in the package.

Check that the selected part, accessory or add on component is the correct one for the application in question. Specifation of data is given in the instruction leaflet in the package.

Replace the old gaskets with the new ones supplied in the package and check for leakage when the supply is switched on again.

After installation and/or replacement has been completed, a gas leak test must be carried out.

Also check the gas valve for satisfactory operation after fitting accessories.

Coils

Important

When ordering replacement coils include the complete valve O.S. number, in order to provide the coil with proper product identification sticker.

Coil for VE-series	10A- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB052401
	24-28	dc	BB052801
	110	ac	BB051101
	220-240	ac	BB052301

Coil for VE-series	10B, C- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152401
	24-28	dc	BB152801
	110	ac	BB151101
	220-240	ac	BB152301

Coil for VE-series	15A- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051102
	220-240	ac	BB052302

Coil for VE-series	15B- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	BB152401
	24-28	dc	BB152804
	110	ac	BB151107
	220-240	ac	BB152305

Coil for VE-series	15A- 200-360mbar		
	Voltage		Bobine Standards
	12	dc	BB051202
	24	ac	BB052401
	24-28	dc	BB052801
	110	ac	BB051101
	220-240	ac	BB052301

Coil for VE-series	15B,C- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152401
	24-28	dc	BB152801
	110	ac	BB151101
	220-240	ac	BB152301

Coil for VE-series	20A- 200-360mbar		
	Voltage		Bobine Standards
	12	dc	BB051205
	24	ac	BB052425
	24-28	dc	BB052825
	110	ac	BB051125
	220-240	ac	BB052325

Coil for VE-series	20B,C- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152425
	24-28	dc	BB152825
	110	ac	BB151125
	220-240	ac	BB152325

Coil for VE-series	20A- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB052326

Coil for VE-series	20B- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151108
	220-240	ac	BB152324

Coil for VE-series	20S- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152401
	24-28	dc	BB152801
	110	ac	BB151101
	220-240	ac	BB152302

Coil for VE-series	20S- 200-360mbar- IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151107
	220-240	ac	

Coil for VE-series	25A- 200-360mbar		
	Voltage		Bobine Standards
	12	dc	BB051205
	24	ac	BB052425
	24-28	dc	BB052825
	110	ac	BB051125
	220-240	ac	BB052325

Coil for VE-series	25B,C- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152425
	24-28	dc	BB152825
	110	ac	BB151125
	220-240	ac	B152325

Coil for VE-series	25A- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051126
	220-240	ac	BB052326

Coil for VE-series	25B- 200-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151108
	220-240	ac	BB152324

Coil for VE-series	25C- 200-360mbar - IP65		
	Voltage		Bobine Standards
	12	dc	
	24	ac	
	24-28	dc	
	110	ac	BB151126
	220-240	ac	

Coil for VE-series	25S- 200-360mbar		
	Voltage		Bobine Standards
	24	ac	BB152401
	24-28	dc	BB152801
	110	ac	BB151101
	220-240	ac	BB152302

Coil for VE-series	32A- 200mbar		
	Voltage		Bobine Standards
	24	ac	BB052432
	24-28	dc	BB052842
	110	ac	BB051133
	220-240	ac	BB052340

Coil for VE-series	32B,C- 200mbar		
	Voltage		Bobine Standards
	24	ac	BB152440
	24-28	dc	BB152840
	110	ac	BB151140
	220-240	ac	BB152326

Coil for VE-series	32A-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	

Coil for VE-series	32B-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151103
	220-240	ac	BB152340

Coil for VE-series	32C-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB152340

Coil for VE-series	32A-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051140
	220-240	ac	BB052342

Coil for VE-series	32B-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151104
	220-240	ac	

Coil for VE-series	40A-200mbar		
	Voltage		Bobine Standards
	24	ac	BB052432
	24-28	dc	BB052842
	110	ac	BB051133
	220-240	ac	BB152340

Coil for VE-series	40B,C-200 mbar		
	Voltage		Bobine Standards
	24	ac	BB152440
	24-28	dc	BB152840
	110	ac	BB151140
	220-240	ac	BB152326

Coil for VE-series	40A-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB052303

Coil for VE-series	40B,C-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151103
	220-240	ac	BB152340

Coil for VE-series	40A-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051140
	220-240	ac	BB052342

Coil for VE-series	40C-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB152328

Coil for VE-series	40B-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151104
	220-240	ac	

Coil for VE-series	50A-200mbar		
	Voltage		Bobine Standards
	24	ac	BB052453
	24-28	dc	BB052802
	110	ac	BB051150
	220-240	ac	BB052303

Coil for VE-series	50B, C-200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	BB152803
	110	ac	BB151103
	220-240	ac	BB152340

Coil for VE-series	50A-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB052307

Coil for VE-series	50B,C-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051152
	220-240	ac	BB152303

Coil for VE-series	50A-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051152
	220-240	ac	BB052306

Coil for VE-series	50B-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB152342

Coil for VE-series	50B-360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151153
	220-240	ac	BB152307

Coil for VE-series	65A-100-200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB051165
	220-240	ac	BB052365

Coil for VE-series	65B-200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	BB152466
	110	ac	BB151165
	220-240	ac	BB152365

Coil for VE-series	65B-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151180
	220-240	ac	BB152380

Coil for VE-series	65B-200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151167
	220-240	ac	BB152366

Coil for VE-series	80B-200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	BB152481
	110	ac	BB151180
	220-240	ac	BB152380

Coil for VE-series	80B-360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151105 (booster)
	220-240	ac	BB152382 (booster)

Coil for VE-series	80B- 200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151181
	220-240	ac	

Coil for VE-series	80B- 360mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	
	220-240	ac	BB152383 (booster)

Coil for VE-series	100A- 200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151112
	220-240	ac	BB152300

Coil for VE-series	100A- 360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151113
	220-240	ac	BB152308

Coil for VE-series	100B- 200mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151112
	220-240	ac	BB152300

Coil for VE-series	100B- 360mbar		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151113
	220-240	ac	BB152308

Coil for VE-series	100B- 200mbar - IP65		
	Voltage		Bobine Standards
	24	ac	
	24-28	dc	
	110	ac	BB151100
	220-240	ac	

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Immersion Temperature Sensor

TITAN Products immersion sensor is designed to measure temperature conditions in liquid flow lines. The sensor element is enclosed in a rigid stem which is mounted into a pocket with options for brass (standard) or stainless steel. The immersion pocket length is 125mm as standard with a shorter 65mm also available. Other lengths are available on request. Please contact the sale team for more information.

For chilled water applications the sensor stem, sensor element and terminal board are epoxy sealed to prevent the influence of condensation in low temperature conditions. The sensor is available with a range of temperature measurement elements and comes supplied with brass pockets as standard.

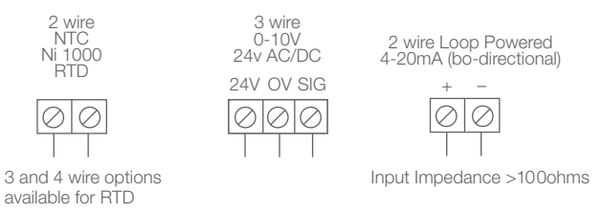
Specification

Material	Body:	Flame Retardant Polycarbonate
	Probe:	Brass
	Pocket:	Brass or Stainless Steel
Sensing Elements:		See Below
Accuracy :		±0.2ºC @ 70ºC Thermistor ±0.4ºC 4-20mA ±0.5ºC 0-10 volts
Operating Temperature:		-40 to + 110ºC (Standard Body) -40 to + 150ºC (Die cast body)
Terminals:		1.0mm recommended 2.5mm max
Location:		Positioned to measure the controlled condition
Dimensions	Probe:	125mm as standard
	Body:	60mm high, 65mm wide, 36mm deep 20mm cable gland entry
Protection:		IP65
Product Codes:		See Below **State R for Chilled Water** **State SS for Stainless Steel pocket option** **State 65 for 65mm immersion pocket option**

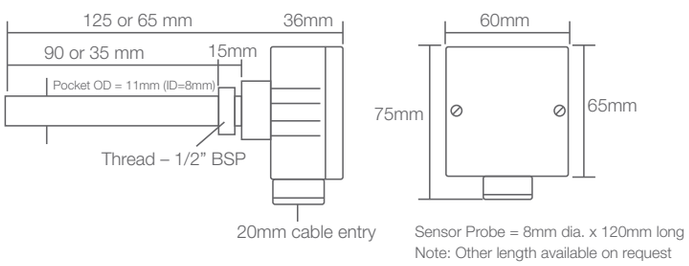
Product Codes

Element Type	System Compatibility	Product Code (Standard 125mm brass pocket)	Accuracy
1.8K7	TAC	TPTACIS	±0.2ºC
2.2K3A1	Johnsons / Ambiflex	TPIS/2K2	±0.2ºC
3K3A1	Alerton	TPTS-I/U	±0.2ºC
10K3A1	Trend / Jel / Honeywell Aquatrol 2000 / Ambiflex / Next / Smart / York	TPTIS	±0.2ºC
10K4A1	Andover / Automatrix / York / Siebe	TPAIS	±0.2ºC
20K6A1	Honeywell	TPHIS	±0.2ºC
30K6A1	Drayton	TPDIS	±0.2ºC
100K6A1	York (> +40˚C)	TPIS/100K6	±0.2ºC
Satchwell	Satchwell T Range	TPSIS/1701	±0.2ºC
Satchwell	Satchwell DR Range	TPSIS/1204	±0.2ºC
Staefa T1	Staefa T1	TP-T1IS	±0.3ºC
Staefa T30	Staefa T30	TPT30IS	±0.3ºC
Ni1000	Landis & Gyr	TPIS/Ni1000	±0.3ºC
PT100	PT100	TPPT2IS	±0.3ºC
PT1000	PT1000	TPPT3IS	±0.3ºC
4-20mA	2 Wire Loop Powered	TPIS/40 (-10 to +40˚C) TPIS/110 (-10 to +110˚C) TPIS/160 (-10 to +160˚C)	±0.4ºC
0-10V	3 Wire 24V Supply	TPVIS/40 (-10 to + 40˚C) TPVIS/100 (0 to + 100˚C)	±0.5ºC

Wiring



Dimensions



Sensor Probe = 8mm dia. x 120mm long
Note: Other length available on request

Sensor in supplied without cable entry gland (TPCG20). If required, order separately.

* State R for Chilled Water ** State 65 for 65mm probe *** State SS for Stainless Steel Pocket EG: TPTIS/SS/65

TITAN Products Ltd.

BELIMO

Technical data sheet R3..xx-S..

Characterised control valve, 3-way, Internal thread

- **For closed cold and warm water systems**
- **For modulating water-side control of air handling units and heating systems**
- **Air bubble-tight (control path A - AB)**

Type overview

Type	kvs [m³/h]	DN [ ]	Rp [”]	PN [ ]	n(gl) [ ]	Sv min. [ ]
R3015-P25-S1	0.25	15	1/2	16	3.2	50
R3015-P4-S1	0.4	15	1/2	16	3.2	50
R3015-P63-S1	0.63	15	1/2	16	3.2	50
R3015-1-S1	1	15	1/2	16	3.2	50
R3015-1P6-S1	1.6	15	1/2	16	3.2	50
R3015-2P5-S1	2.5	15	1/2	16	3.2	50
R3015-4-S1	4	15	1/2	16	3.2	100
R3020-4-S2	4	20	3/4	16	3.2	100
R3020-6P3-S2	6.3	20	3/4	16	3.2	100
R3025-6P3-S2	6.3	25	1	16	3.2	100
R3025-10-S2	10	25	1	16	3.2	100
R3032-16-S3	16	32	1 1/4	16	3.2	100
R3040-16-S3	16	40	1 1/2	16	3.2	100
R3040-25-S4	25	40	1 1/2	16	3.2	100
R3050-25-S4	25	50	2	16	3.2	100
R3050-40-S4	40	50	2	16	3.2	100
R3050-58-S4	58	50	2	16	3.2	100

Technical data

Functional data	Media	Cold and warm water, water with glycol up to max. 50% vol.
	Medium temperature	-10...120°C
	Medium temperature note	The allowed media temperature can be limited, depending on the type of actuator. Limitations can be found in the respective data sheets of the actuators.
	Rated pressure ps	1600 kPa
	Closing pressure Δps	1400 kPa
	Differential pressure Δpmax	350 kPa
	Differential pressure note	200 kPa for low-noise operation
	Flow rate	Bypass B – AB: 70% of kvs value
	Flow characteristic	Control path A – AB: equal percentage (VDI/VDE 2178), optimised in the opening range, Bypass B – AB: linear (VDI/VDE 2178)
	Leakage rate	Control path A - AB: Leakage rate A, air-bubble-tight (EN 12266-1), Bypass B - AB: Leakage class I (EN 1349 and EN 60534-4) approx. 1...2% of the kvs value, with respect to the largest value within the DN
	Pipe connectors	Internal thread according to ISO 7-1
	Angle of rotation	90° (Operating range control path A - AB 15...90°, Bypass B – AB 15...70°)
	Installation position	Upright to horizontal (in relation to the stem)
	Maintenance	Maintenance-free
Materials	Housing	Brass body nickel-plated
	Closing element	Stainless steel

Technical data

Materials

Stem	Stainless steel
Stem seal	O-ring EPDM
Valve seat	PTFE, O-ring EPDM
Characterising disc	TEFZEL R3040-25-S4, R3050-40-S4, R3050-58-S4: Stainless steel

Safety notes

- The valve has been designed for use in stationary heating, ventilation and air-conditioning systems and is not allowed to be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.
- Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.
- The valve does not contain any parts that can be replaced or repaired by the user.
- The valve may not be disposed of as household refuse. All locally valid regulations and requirements must be observed.
- When determining the flow rate characteristic of controlled devices, the recognised directives must be observed.

Product features

Mode of operation

The characterised control valve is adjusted by a rotary actuator. The actuator is controlled by a commercially available modulating or 3-point control system and moves the ball of the valve – the throttling device – to the position dictated by the positioning signal. Open the characterised control valve counterclockwise and close it clockwise.

Flow characteristic

Equal percentage flow control is ensured by the integrated characterising disc.

Accessories

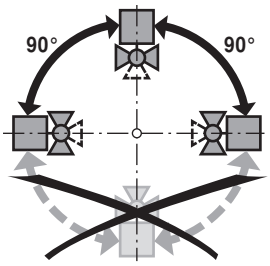
Mechanical accessories

Description	Type
Pipe connector to ballvalves DN 15 Rp 1/2“	ZR2315
Pipe connector to ballvalves DN 20 Rp 3/4“	ZR2320
Pipe connector to ballvalves DN 25 Rp 1“	ZR2325
Pipe connector to ballvalves DN 32 Rp 1 1/4“	ZR2332
Pipe connector to ballvalves DN 40 Rp 1 1/2“	ZR2340
Pipe connector to ballvalves DN 50 Rp 2“	ZR2350

Installation notes

Recommended installation positions

The ball valve can be installed upright to horizontal. The ball valve may not be installed in a hanging position, i.e. with the stem pointing downwards.



Water quality requirements

The water quality requirements specified in VDI 2035 must be adhered to.
Belimo valves are regulating devices. For the valves to function correctly in the long term, they must be kept free from particle debris (e.g. welding beads during installation work).
The installation of suitable strainer is recommended.

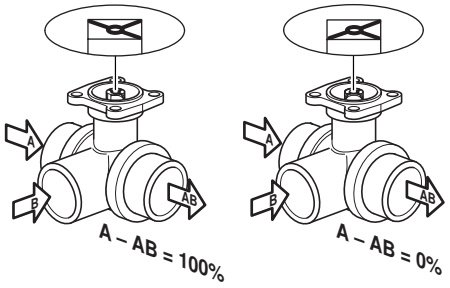
Installation notes

Maintenance

Ball valves and rotary actuators are maintenance-free.
Before any kind of service work is carried out on the actuator, it is essential to isolate the rotary actuator from the power supply (by unplugging the electrical cable). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow everything to cool down first if necessary and reduce the system pressure to ambient pressure level).
The system must not be returned to service until the ball valve and the rotary actuator have been properly reassembled in accordance with the instructions and the pipeline has been refilled in the proper manner.

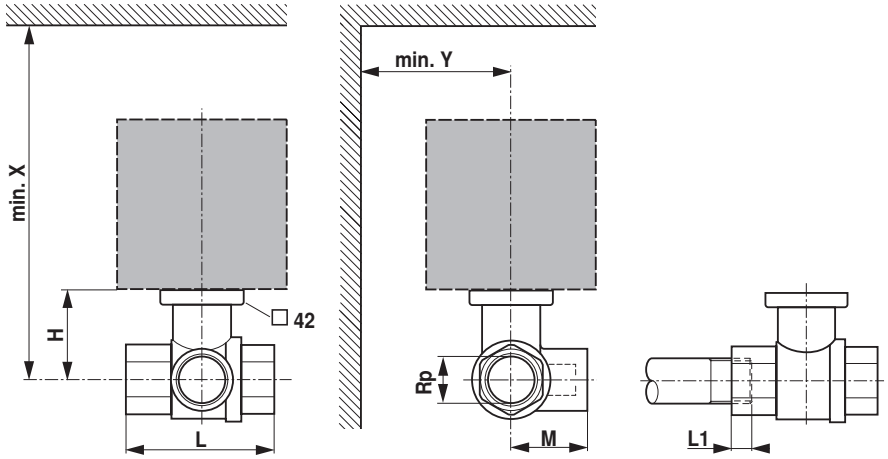
Flow direction

The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the ball valve could become damaged. Please ensure that the ball is in the correct position (marking on the spindle).



Dimensions / Weight

Dimensional drawings



L1: Maximum screwing depth.
X/Y: Minimum distance with respect to the valve centre.
The actuator dimensions can be found on the respective actuator data sheet.

Dimensions / Weight

Type	DN [ ]	Rp ["]	L [mm]	L1 [mm]	M [mm]	H [mm]	X [mm]	Y [mm]	Weight approx. [kg]
R3015-P25-S1	15	1/2	67	13	36	35	230	90	0.27
R3015-P4-S1	15	1/2	67	13	36	35	230	90	0.27
R3015-P63-S1	15	1/2	67	13	36	35	230	90	0.27
R3015-1-S1	15	1/2	67	13	36	35	230	90	0.27
R3015-1P6-S1	15	1/2	67	13	36	44	230	90	0.37
R3015-2P5-S1	15	1/2	67	13	36	44	230	90	0.37
R3015-4-S1	15	1/2	67	13	36	44	230	90	0.37
R3020-4-S2	20	3/4	78	14	41.5	46	235	90	0.46
R3020-6P3-S2	20	3/4	78	14	41.5	46	235	90	0.46
R3025-6P3-S2	25	1	87	16	45	46	235	90	0.65
R3025-10-S2	25	1	87	16	45	46	235	90	0.65
R3032-16-S3	32	1 1/4	105	19	55.5	50.5	240	90	0.95
R3040-16-S3	40	1 1/2	111	19	56	50.5	240	90	1.15
R3040-25-S4	40	1 1/2	122	19	66.5	62	250	90	1.15
R3050-25-S4	50	2	125	22	68	56	245	90	1.9
R3050-40-S4	50	2	142	22	79	68	262	90	1.8
R3050-58-S4	50	2	142	22	79	68	262	90	1.8

Further documentation

- Overview Valve-actuator combinations
- Data sheets for actuators
- Installation instructions for actuators and/or ball valves
- General notes for project planning

BELIMO

R2..-S..

R3..-S..

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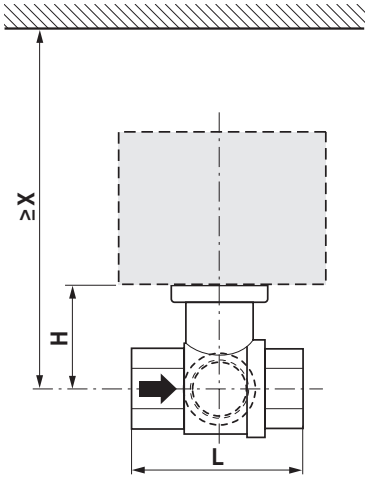
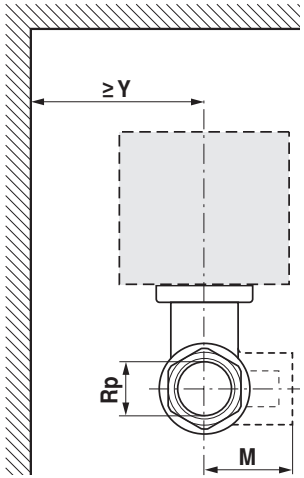
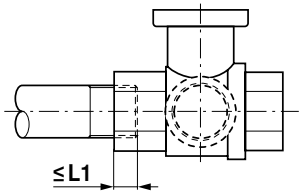
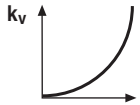




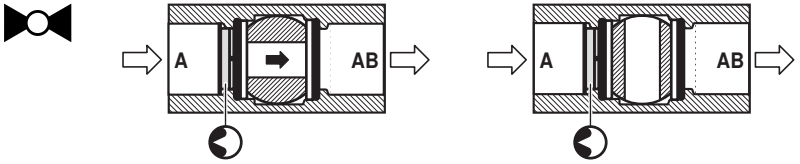


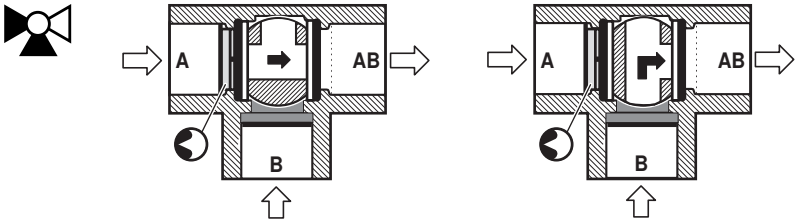
t	–10 ... +120°C
p_s	1600 kPa

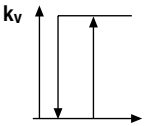
		DN	Rp	mm				80°C		100°C		120°C						100°C		120°C					
								KR..		TR..		LR..A		NR..A		SR..A		TRF..		LRF..		NRF..A		SRF..A	
		mm	”	L	H	M	L1	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
R2015..-S1	R3015..-S1	15	1/2”	67	44	36	13	150	75	185	75	195	75	230	80	230	80	190	80	200	90	220	90	220	90
R2020..-S2	R3020..-S2	20	3/4”	78	46	41.5	14					200	75	235	80	235	80			205	90	225	90	225	90
R2025..-S2	R3025..-S2	25	1“	87	46	45	16					200	75	235	80	235	80			205	90	225	90	225	90
R2032..-S3	R3032..-S3	32	1 1/4“	105	50.5	55.5	19							240	80	240	80					230	90	230	90
R2040..-S3	R3040..-S3	40	1 1/2“	111	50.5	56	19							240	80	240	80					230	90	230	90
	R3040-25-S4	40	1 1/2“	122	62	66.5	19									250	80							240	90
R2050..-S4	R3050..-S4	50	2“	125	56	68	22									245	80							235	90
	R3050-40-S4 R3050-58-S4	50	2“	142	68	79	22									262	80							252	90



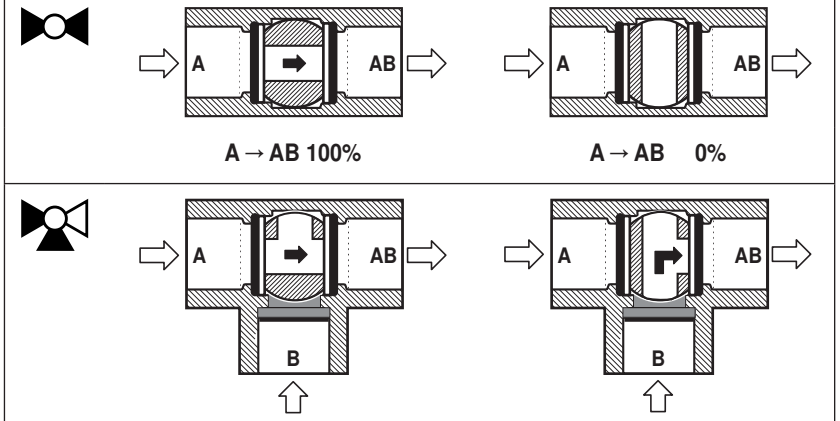
Δp_{vmax} <350 kPa

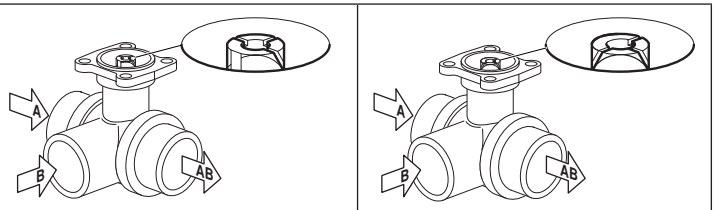




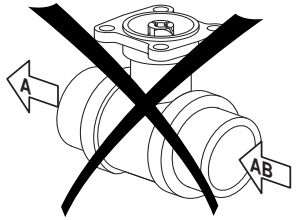


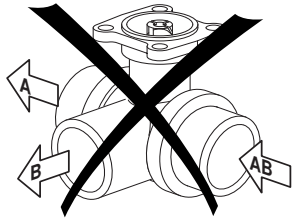
Δp_{vmax} <1000 kPa

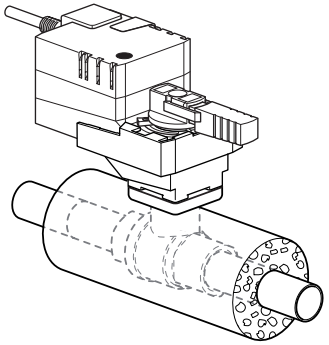


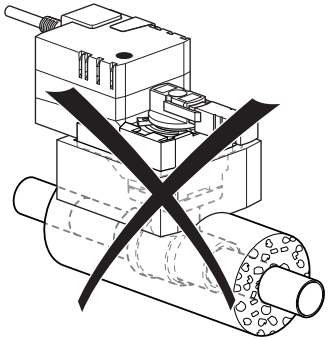


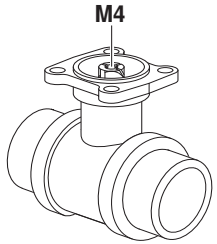
	A → AB 100%	A → AB 0%
	B → AB 0%	B → AB 100%

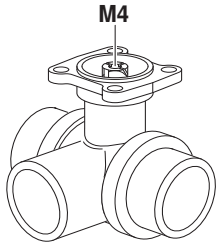


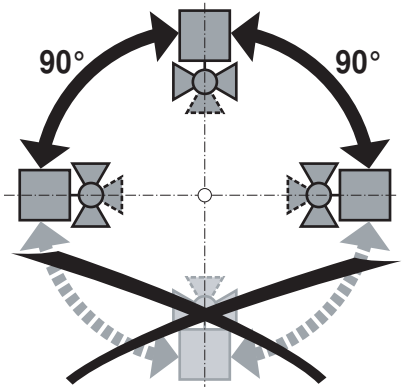












Data Sheet

IQView4
Touch Screen Display

IQView4

Description

The IQView4 is a touch screen display which provides an interface to an IQ controller. It enables the user to view and adjust operating times, monitor alarms, make adjustments to controller parameters, and display graphs of logged data.

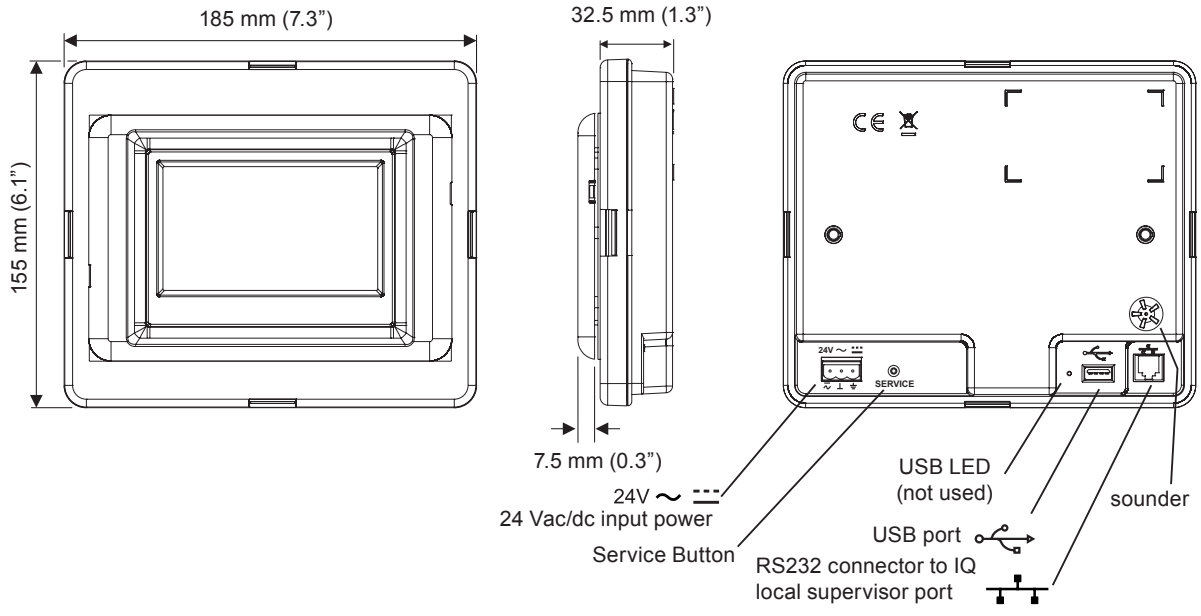
The unit is panel mountable with a surface mounting option available enabling the IQView4 to be mounted in a way suitable for its environment and use.

Features

- Viewing of inputs, outputs, directories, alarms, plots
- Adjustment of knobs, switches, time zones, and time
- Graphing of logged data
- Configurable users to ensure system security
- Communicates with IQ1s (v5 and above), IQ2s, IQ3s and IQ4s via controller's local supervisor port.
- RS232 connection
- Panel or surface mounting
- 480 x 272 pixels colour touch screen LCD display screen
- 24 Vac/dc input power supply
- IP50 (when panel mounted)

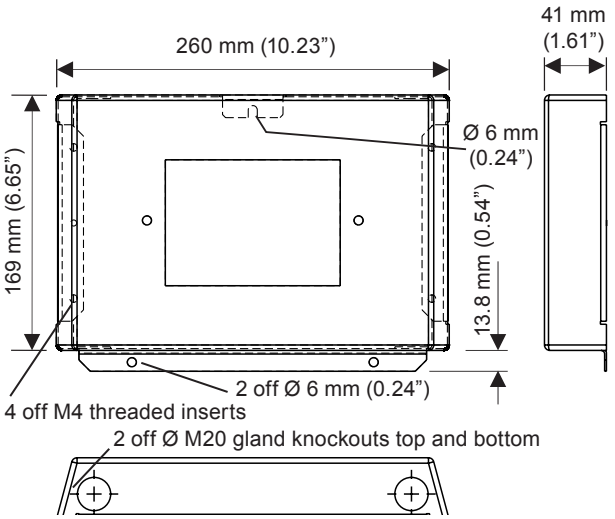
Physical

IQView4 (Panel mounting)

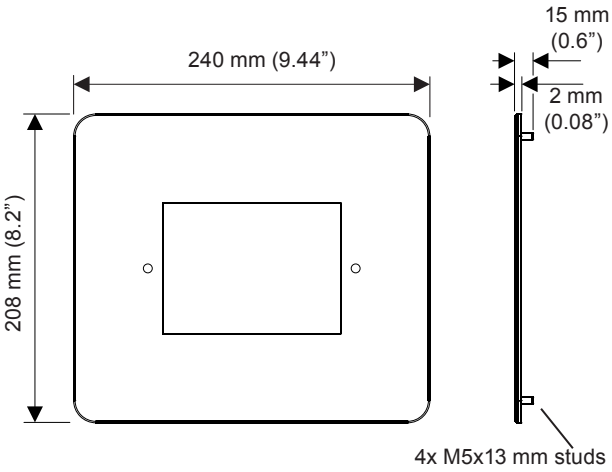


Physical (continued)

IQVIEW4 SM BOX (Surface Mounting)



IQVIEW4/FPK ADAPTOR PLATE



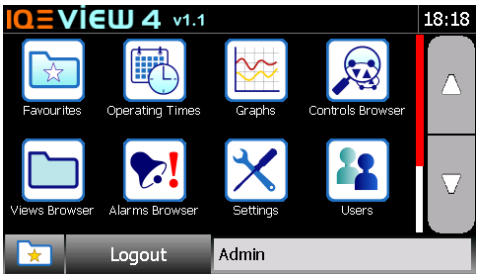
FUNCTIONALITY

The functionality of the IQView4 touch screen display can be split into **Software**, **Controller Connection**, and **Hardware** sections:

SOFTWARE

The IQView4's software provides its functionality. It enables viewing/adjustment of operating times and device values, as well as the display of graphs from an intuitive touch screen interface. It also enables the IQView4 to be configured.

The Task Launcher - Features screen is shown below:



The Task Launcher - Features screen contains icons that enable the selection of the main features.

Icon	Description
	Provides access to the operating times of controllers on the system.
	Provides access to graph views. From here graph views can be displayed, created or deleted. It also enables you to browse directly to any controller plot and display it as a graph.
	Provides access to the presentation modules (i.e. sensors, digital inputs, critical alarms (IQ1 and IQ2), knobs, switches, time zones, and drivers) and control loops of the controller which the IQView4 is connected. From here the values can be viewed, adjusted, or graphed.
	Provides access to display and directory modules on the controller to which the IQView4 is connected. From here the values can be viewed as a list of points.
	Provides access to alarms on the controller

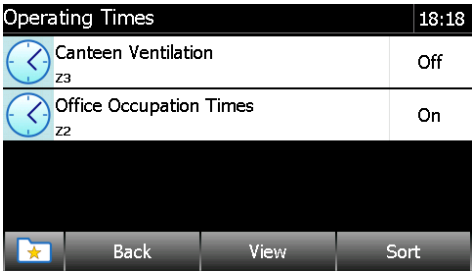
Icon	Description
	Allows the IQView4's settings to be viewed/configured. It also provides access to the facilities to upgrade the software, back up or restore the configuration, perform a restart, or access diagnostic information.
	Provides access to the IQView4's security features enabling the creation, deletion, and editing of the IQView4's users.
	Displays information about the IQView4 (e.g. Version, Build, Date, Start time).

The bottom of the display has buttons and indicators. :

	Present on most displays it takes the user to the Favourites page
Login/ Logout	Enables the user to log in or log out. It also indicates whether a user is logged in or out; if the button shows 'Logout' then a user is currently logged in (and vice versa).
Admin	Shows status messages.
	Indicates whether a USB memory stick is plugged in to the unit.

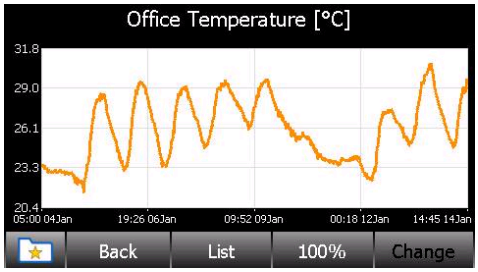
Operating Times

The IQView4 enables the user to make adjustments to the operating times in the controller. It allows adjustment of standard operating times, operating times for the current week, or setting up exceptions for the year ahead.



Graphs

IQView4 is able to display logged data from the controller in multi-trace graphs. A single graph can contain multiple traces from different controllers enabling easy comparison of data. Any point logged in the controller can be graphed.



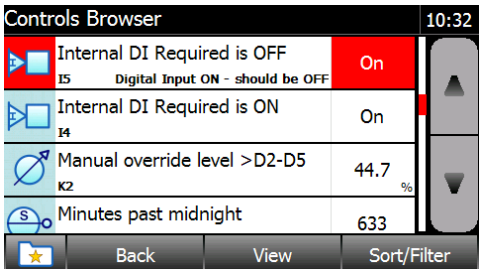
Graphs can accessed from a list of values in the controller (Controls Browser), or from the display and directory navigation (Views Browser). It is possible to zoom in on selected parts of the graph, display spot values, or view the underlying data.

The configuration of a graph can be saved and viewed again (with the latest data). Saved graphs allow quick access to regularly used graphs; each saved graph view can have multiple traces, and can be set up to look as required.

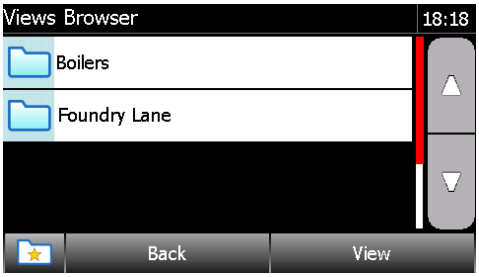
View Controller Data

Values of module parameters from presentation modules (i.e. sensors, digital inputs, critical alarms (IQ1 and IQ2), knobs, switches, loops, time zones, and drivers) from the controller to which the IQView4 is connected can be viewed using either the Controls Browser, or the Views Browser.

Controls Browser



Views Browser



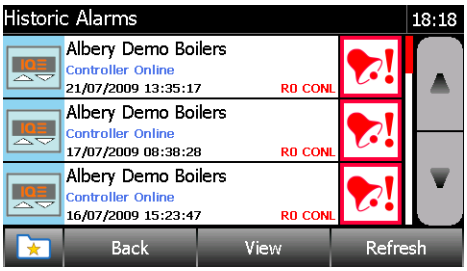
The Controls Browser displays a list of sensor, digital input, critical alarm, knob, switch, timezone, driver, and loop modules Once the values are displayed they can be viewed, adjusted, or graphed as appropriate depending on the type of value.

The Views Browser enables the display and directory modules in the controller to be accessed.

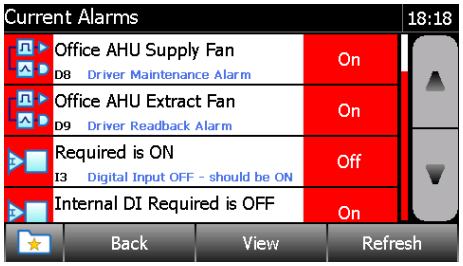
Alarms Browser

The Alarms Browser gives access to the controller's historic or current alarms.

The Historic Alarms come from the controller's alarm history buffer (alarm log).



The Current Alarms show all the current item alarms (module alarms which are enabled) and critical alarms (pre-IQ3 controllers only).



Users (Security)

IQView4 can be operated with or without security.

When operating without security it is not necessary to provide a user name and password in order to access the unit. Anyone will have full access to all of IQView4's features.

When security is enabled it is necessary to log in using a user name and password, and the features available to the user are determined by the user's access rights. There are two users set up by default (Administrator and Guest).

Each user has a user name, password, level of authority (PIN level), language, and access rights. The access rights determine which of the IQView4's features they have access to.

The IQView4's user security prevents unauthorised access to IQView4's features. Changes made to module parameters in IQ controllers may also be protected by the controller's own security.

Settings

The IQView4 provides range of menus that enable viewing or configuration of date and time, display settings (including screen saver operation), language selection for the user interface, security access settings, system functions (including backup, restore and upgrade) and diagnostic information.

About

Information about the IQView4 (i.e. Version, Build, Date, Start time) is displayed.

Favourites

Any page can be selected as a favourite allowing the access to regularly used pages from the Favourites page which can be selected using .

Backup and Restore

All or part of IQView4's configuration can be saved to a USB memory stick. The USB memory stick may be removed and stored in a safe location as a back up, or reused to configure another IQView4.

Software Upgrade

The IQView4 includes an upgrade feature allowing the software to be upgraded from a USB memory stick.

CONTROLLER CONNECTION

The IQView4 has an RS232 port for connection to an IQ controller's local supervisor port. The RS232 port on the IQView4 enables direct connection to the local supervisor port of IQ1xx, IQ2xx, IQ3 or IQ4 controllers.

Physical connection
Connection of IQView4 using its RS232 connector requires use of the appropriate cables as described in the table:

Connecting to	Cable Required
IQ4 IQ3 IQ2xx IQ1xx with RJ11 connector	RJ11 to RJ11 adapter cable (RD/SDU-IQ2COMMSCABLE/3M). Supplied with IQView4
IQ1xx with 25 Way D type connector	RJ11 to 25 Way D type male adapter cable (CABLE/EJ105651).
IQ1xx with 5 way in-line connector	RJ11 to 25 Way D type male adapter cable (CABLE/EJ105651) in conjunction with the 25 way socket to 5 in-line socket adapter cable (CABLE/78-1172).

Note: The IQView4 is supplied with a 3 m (9' 10") RJ11 to RJ11 cable. If required the 10 m cable (RD/SDU-IQ2COMMSCABLE/10M, EJ105047), may be used instead of the 3m cable (RD/SDU-IQ2COMMSCABLE/3M).

HARDWARE

Mounting

The IQView4 can be panel, or surface mounted.

Panel Mounting
The IQView4 is designed for rear panel mounting, and can be mounted by simply cutting the required cutout, placing the unit into the hole, and fixing the retainer clips. When correctly mounted in this way the unit has an IP rating of IP50 from the front when the panel is closed.

The assembly consists of the main unit, 2 retainer clips and screws, and a bezel. It can be mounted in panels up to 2 to 5 mm (0.08" to 0.2"), the normal thickness of a metal panel.

The power and networking cables can be run into the panel and then directly to the IQView4, Access to the USB connector a require the panel to be opened.

Surface Mounting
The IQView4 can be mounted on a wall or on a panel (without the need to cut holes) using the surface mounting kit (IQVIEW4 SM BOX). For wall mounting it uses a 3 point fixing, with cable access either from the rear or from M20 cable entry knockouts, two in the top face and two in the bottom face. For panel mounting it uses a 4 point fixing by screwing through the panel from the rear with cable entry normally from the rear; the 4 M4 screws are provided.

Note: IQVIEW4 SM BOX can also be used when replacing any of the display panels (GDP, FPK, NDP, SDU).

Display Replacement
IQView4 can be used with the adaptor plate (IQVIEW4/FPK ADAPTOR PLATE) to replace an FPK, DP, GDP, GDP+ or NDP on panels up to 5 mm (0.2") thick.

Note: IQView4 will not physically replace a DP (2 line display panel) fitted in the cover of an IQ controller; it would have to be fitted alongside, with the DP left in place.

The IQView4 can also be used to replace a panel mounted SDU-IQ or SDU-xcite.

Input Power

The unit requires a 24 Vac, 50/60 Hz, 8 VA supply, or a 24 Vdc, 3 W supply.

Note: This power level cannot be provided from an IQ controller's auxiliary supply output; a separate supply is required.

Note: The 'neutral' terminal (⊥) of the 24 Vac input power supply is internally connected to the IQView4's earth (ground) terminal.

A 230 V/24 Vac, 36 VA, transformer is available (ACC/24VAC). This is a sealed unit with two mounting lugs; it has an isolated 24 Vac output and an additional earth (ground) lead connected through from its input power supply earth (ground) to the 24 Vac output earth (ground) for earthing (grounding) the IQView4.

A general purpose 24 Vac transformer may be used to supply the IQView4, but if one side of its output is earthed (grounded), this side must be connected to the IQView4's 'neutral' (⊥) terminal.

The IQView4 must be earthed (through its input power supply earth (ground) terminal). For the UL rating the input power connections must be made using 18 AWG or larger wire rated at least 90°C.

The 24 V supply must include a suitably rated switch in close proximity and be clearly marked as the disconnecting device for the unit.

Fusing

The input supply is protected by a 3.15 A fast-blow fuse; this protects the IQView4 board from drawing excessive current from the supply. If it blows the unit should be returned to the supplier for repair.

Indicator

The following indicator is on the unit:

USB Power: (green) Not used. For future development

Sounder

The sounder can produce a key click when the touch screen is tapped, if the key click is enabled. By default the key click is disabled. It can be enabled using the application software.

Power failure protection

The IQView4 does not require a battery. Configuration data is stored in non-volatile memory (Flash). It's database will be restored after power failure; this includes the presentation modules discovered in the controller (i.e. sensors, drivers etc) and any customer settings including Users, language etc. After power failure, the IQView4 will obtain the time and date from the controller.

Display

The IQView4 has a 4.3" 480 x 272 pixel (16 bit) LCD Transmissive colour display with touch screen. The backlight is LED with autodim. The autodim function enables the screen brightness to be dropped to ½ brightness after a user definable backlight delay time (auto dim off, or 1, 2, 3, 4 or 5 minutes).

The screen should only be tapped using a finger, no sharp objects (e.g. screwdriver) or pointers should be used. Failure to comply may damage the unit.

Connectors

The IQView4 has the following connectors:

RS232: The RS232 connector is an RJ11 socket used for connection to the controller.

Power: The power connector is a 2 part 3 wide screw terminal connector used for connecting the unit to the power supply.

USB: Standard USB A connector for memory stick. USB stick maximum size 2 Gbyte, fully formatted FAT/FAT32.

Two part connectors are used throughout to facilitate installation.

USB Port

The IQView4 has a USB port which can be used to plug in a memory stick (maximum size: 2 Gbyte, fully formatted FAT/FAT32). This can be used for several purposes:

Backup and Restore: to backup and restore the user configuration data. The data can be written to the card, and the card may be removed and stored in a safe location as a backup, or to transport the configuration from one IQView4 to another.

Software Upgrade: The software can be upgraded by way of the USB port. The application software enables the user to select the upgrade function.

Service Button

The service button when pressed during power up provides access to the units factory configuration settings. This feature should only be accessed when instructed by Trend Technical Support.

FIELD MAINTENANCE

The IQView4 requires virtually no routine maintenance. The unit should be cleaned with a cloth moistened with water in order to avoid buildup of dust or other contaminents. **Disconnect power before carrying out any cleaning.**

The screen should be cleaned regularly to remove dust and grease by wiping gently with a soft cloth such as that used for spectacles.

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF IQView4.

RECYCLING ♻.
All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

WEEE Directive:

At the end of their useful life the packaging, and product should be disposed of by a suitable recycling centre.
Do not dispose of with normal household waste.
Do not burn.

COMPATIBILITY

The IQView4 can connect to a single IQ controller.

Controllers: IQView4 is compatible with IQ1xx controllers version 5 and above and all IQ2xx (not IQ22x/ADL), IQ3 and IQ4 controllers. IQL and FNC/FC controllers are not supported.

Timezones: IQView4 can view and adjust the operating times in IQ1, IQ2, IQ3 and IQ4 controllers. For IQ1 and IQ2 controllers it can adjust the standard and current weeks, and when supported by the controller set up and adjust the Holiday Calendar times. For IQ3 and IQ4 controllers it can adjust the normal week, and set up and adjust the exception times.

Modules: IQView4 will not discover modules without labels.

Plots: IQView4 supports synchronised plots. It is unable to obtain graphs from triggered and periodic plots.

Network connection: The IQView4 connects to a local controller through its supervisor (RS232) port; it has no network access.

GraphIQs: IQView4 does not support the display of GraphIQs from IQ3 and IQ4 controllers.

INSTALLATION

The IQView4 is designed for rear panel mounting. The panel needs to be pierced with a rectangular aperture and drilled with 2 holes, then the panel can be mounted using the two retaining clips and screws provided. A plastic front cover is clipped over the front to hide the screws.

All units are UL rated as 'UL916, listed open energy management equipment'.

The procedure involves:

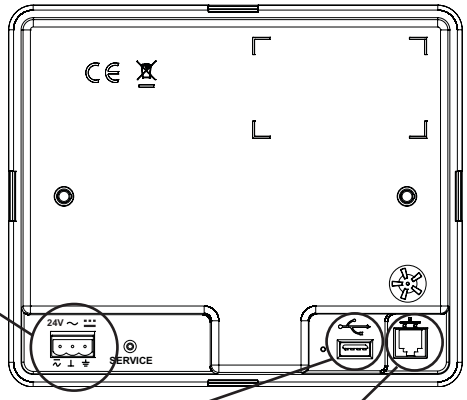
mounting the unit
connecting power, do not power up
connecting to the controller's local supervisor port
reading the End User Licence Agreement
powering up
configuring the unit (if required)
checking operation.

A full description of installing the unit is given in the IQView4 Touch Screen Display Installation Instructions (TG201038). A mounting template, IQView4 Touch Screen Display Template (TG201037), is provided with the unit.

The installation of the IQView4 in a IQVIEW4 SM BOX is described in the IQView4 SM BOX Installation Instructions (TG201078), and IQView4 SM BOX Template (TG201079).

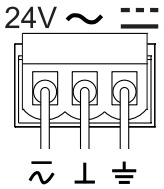
A full description of the use of the IQVIEW4/FPKADAPTORPLATE is given in the IQView4/FPK Adaptor Plate Installation Instructions (TG201039) and IQView4/FPK Adaptor Plate Template (TG201040).

CONNECTIONS (Shown from rear)



Input Power Supply

24 Vac/dc



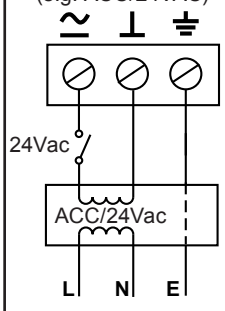
~ 24 Vac	24 Vac		E
⎓ 24 Vdc	+24V	0V	E

CAUTION:
Do not apply 230 V input power to this connector

Note that the required power cannot be guaranteed to be provided from an IQ controller's auxiliary supply output; a separate supply is generally required.

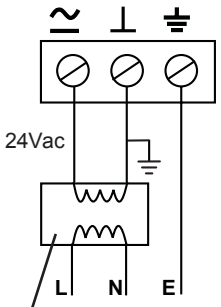
using 230V/24V ac transformer with isolated output

(e.g. ACC/24VAC)



230 Vac

using 230V/24V ac transformer with one side earthed (grounded)



230 Vac

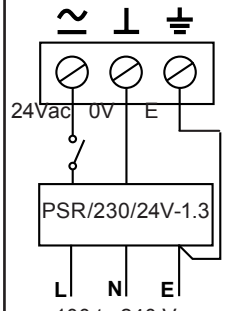
Some transformers are earthed on one side of the secondary.

If so ensure the earthed side is connected to the central terminal of the power connector.

If the polarity of the connection is incorrect the unit will not power up. If this happens swap left and central connectors.

using 24 Vdc power supply

(e.g. PSR/230/24-1.3)

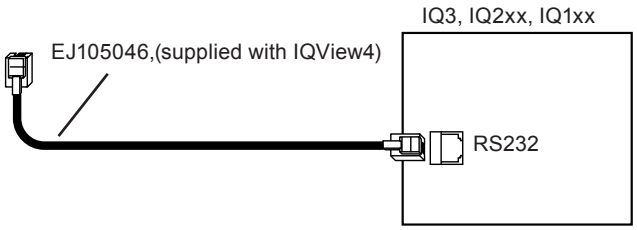


100 to 240 Vac

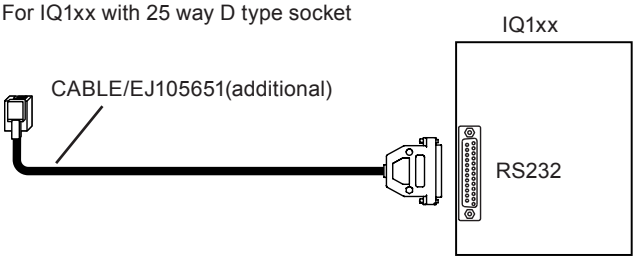
A centre tapped to earth transformer MUST not be used

RS232

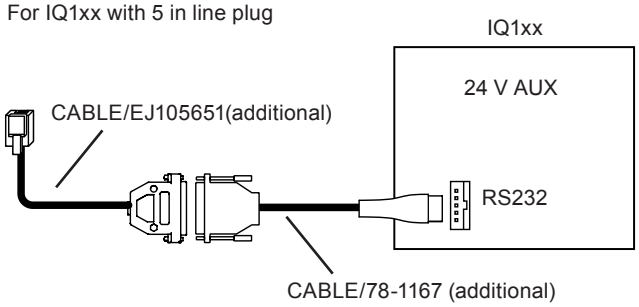
For IQ3, IQ2xx, and some IQ1xx



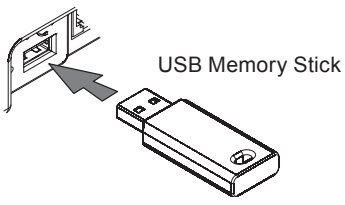
For IQ1xx with 25 way D type socket



For IQ1xx with 5 in line plug



USB Port



ORDER CODES

IQVIEW4/24	**:**IQView4 including 3 m (9’ 10”) RJ11 to RJ11 RS232 cable.

ACCESORIES;

IQVIEW4/FPK ADAPTOR PLATE	:Adaptor plate to facilitate mounting an IQView4 in place of FPK (2 line display panel, front panel kit).
IQVIEW4 SM BOX	:Surface Mount Box for mounting the IQView4 on wall or panel (without need to cut square holes); can also be used when IQView4 is replacing display panels. Complete with screws for panel mounting.
RD/SDU-IQ2COMMSCABLE/3M	:(EJ105046) RJ11 plug to RJ11 plug 3 m cable to connect to IQ3, IQ2xx, and some IQ1xx controllers’ local supervisor ports (as supplied with IQView4).
RD/SDU-IQ2COMMSCABLE/10M	:(EJ105047) RJ11 plug to RJ11 plug 10 m to connect to IQ3, IQ2xx, and some IQ1xx controllers’ local supervisor ports (not UL listed)
CABLE/EJ105651	:RJ11 socket to 25 way D type male to connect to some IQ1xx controllers’ local supervisor ports.
CABLE/78-1172	:RJ11 socket to 5 in line socket to connect to some IQ1xx controllers’ local supervisor ports.

SPECIFICATION

ELECTRICAL

CPU	:Marvell PXA270
Input Power Supply	:24 Vac ±10%, 50/60 Hz; 24 Vdc ±10%
Power consumption	
24 Vac	:8 VA max
24 Vdc	:3 W max.
Fusing	:The input supply is protected by a 3.15 A fast blow fuse.
Mains failure protection	:User configuration data is stored in non-volatile memory (Flash).
Display	:Colour (64k colours), LCD display 480 x 272 pixels (WQVGA) TFT with touch screen.
Backlight	:LED with autodim.
Sounder	:piezo electric.
RS232 port	
Transmission	:RS232, EIA/TIA,232E, V28
Distance	:15 m (16yds)
Baud rate	:9k6
Indicator	
USB LED	:(green) Not used.

MECHANICAL

Dimensions	
IQView4	:185 mm (7.3”) x 155 mm (6.1”) x 40 mm (1.57”)
Weight	
IQView4	:1.16 kg, 2.55 lbs
Connectors	
RS232	:RJ11 (FCC68).
Input Power Supply	:3 wide 2 part connector with screw terminals for 0.5 to 2.5 mm^2 cross section area (20 to 14 AWG) cable
USB	:Standard USB A connector.
Materials	
IQView 4 housing	:PCABS UL94 V0 RTI 80
IQVIEW4/FPK ADAPTOR PLATE	:Mild steel sheet 3mm thick painted
IQVIEW4 SM BOX	:Mild steel sheet 1mm thick painted
Paint	:Organisol letherette RAL 7032

ENVIRONMENTAL

EMC:	EN61326 -1: 2006
Immunity	:(Table 2) For equipment used in industrial locations
Emissions	:EN55011: 2007 Class A EN61000-3-2: 2006 EN61000-3-3 +A2: 2005

Warning: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Safety	EN61010-1:2001
CB Certificate	:TBA
USA/Canada	:UL rated as ‘UL916 listed open energy management equipment’.
Canada	:CSA22.2 No. 205-M1983 - Signal Equipment
Ambient limits	
Storage	:-10 °C (14 °F) to +50 °C (122 °F)
Operating	:0 °C (32 °F) to 45 °C (113 °F)
Humidity	:0 to 80 %RH non-condensing
Altitude	:<2000 m (6562’)
Protection	
Panel mounting	:IP50 (from front if correctly mounted with panel closed)
Version	
Processor	:AP106469 issue 3

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For modulating actuators with a working range of DC 2…10 V or DC 0…10 V

For cubicle mounting

Application

The positioner SGE24 is intended for the remote control of modulating actuators or for use as a minimum positioner (providing a bottom limit for the output signals from modulating controllers). The control range is 0…100% of the angle of rotation of the actuator.

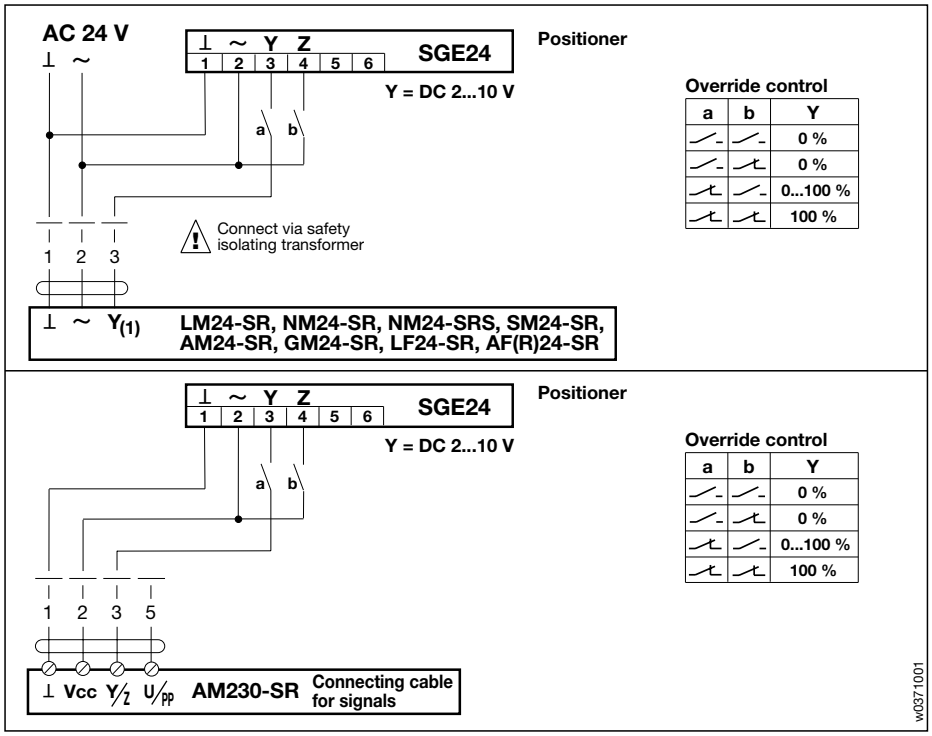
Wide setting range (0…100%)

The positioner receives its power supply through terminals 1 and 2.
The position to which the rotary knob is turned produces a proportional control signal Y of either DC 2…10 V or DC 0…10 V and thus a proportional change in the position of the actuator between 0 and 100%.
The changeover from DC 2…10 V to DC 0…10 V is selected by means of a wire link between the two terminals 5 and 6.

Simple installation

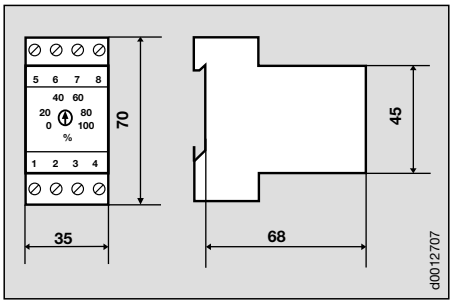
The SGE24 is designed for clipping on to a 35 mm DIN rail top hat profile.

Wiring diagram



Technical data	SGE24
Nominal voltage	AC 24 V 50/60 Hz, resp. Vcc from AM230-SR
Nominal voltage range	AC 19.2...28.8 V
For wire sizing	1.0 VA
Power consumption	0.3 W
Power output	for up to 10 actuators (max. 4 AM…-SR)
Connection	Terminals (for max. 4 mm²)
Control signal Y	DC 2…10 V @ max. 0.5 mA (DC 0…10 V switchable by jumper, terminals 5/6)
Scale	0…100%
Degree of protection	IP 40
Ambient temperature range Non-operating temperature Humidity test	–20… + 50 °C –40… + 80 °C to EN 60335-1
EMC	CE according to 89/336/EEC, 92/31/EEC, 93/68/EEC
Maintenance	maintenance free
Weight	70 g

Dimensions

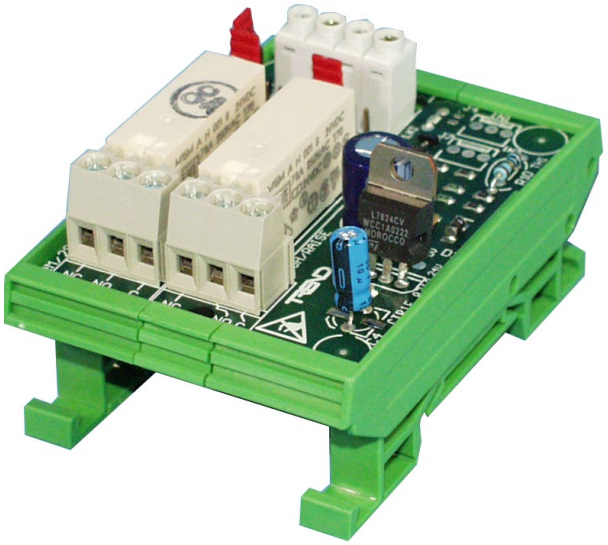


ENG-93001-93228-03.02-2M · Printed in Switzerland · ZSD · Subject to technical changes

Data Sheet

2RM/24VAC
Two Relay Module (24 Vac/dc)

2RM/24VAC Two Relay Module (24 Vac/dc)



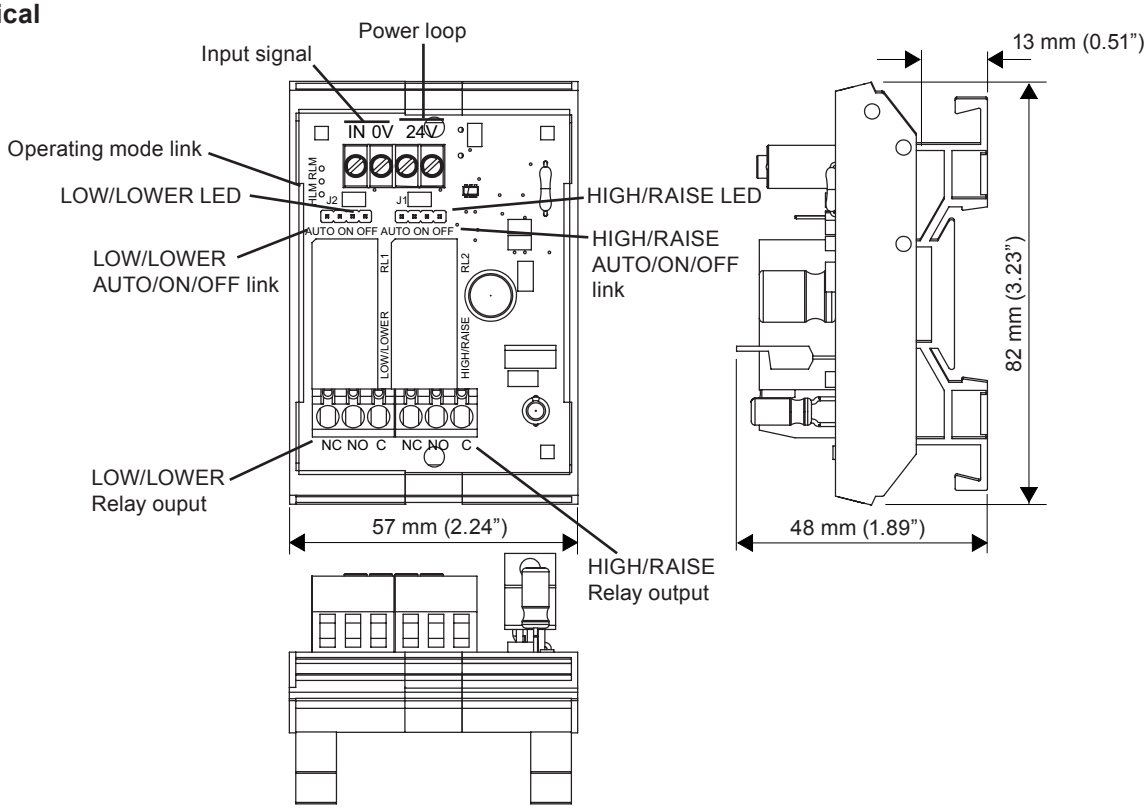
Description

The Two Relay Module (2RM) converts an analogue output of an IQ controller to two stages of relay output, and acts as an interface between the controller and heating and ventilating equipment. It may be configured as a high/low or a raise/lower relay module by link selection. There are manual override links for each relay to aid commissioning. Field wiring is facilitated by rising cage clamp type output terminals, and a power supply loop terminal aids wiring to additional modules.

Features

- High/Low or Raise/Lower link selectable.
- AUTO/ON/OFF Manual override links.
- LED status indication.
- Standard DIN rail mounting.
- Rising cage clamp terminals
- 24 Vac/dc input power supply

Physical



FUNCTIONALITY

Operating Mode: The 2RM converts an analogue voltage output of a IQ controller to two stages of relay output. It may be configured for high/low or raise/lower operation by link selection. In the High/Low mode (HLM) the relays switch in sequence and in the Raise/Lower mode (RLM) the relays switch either to raise or lower; the sequences are shown in the tables below:

HLM	LOW	HIGH
0V	OFF	OFF
5V (2.4)	ON	OFF
10V (8.3)	ON	ON

RLM	LOWER	RAISE
0V	OFF	OFF
4V (2.4)	ON	OFF
7V (6)	OFF	OFF
10V (8.3)	OFF	ON

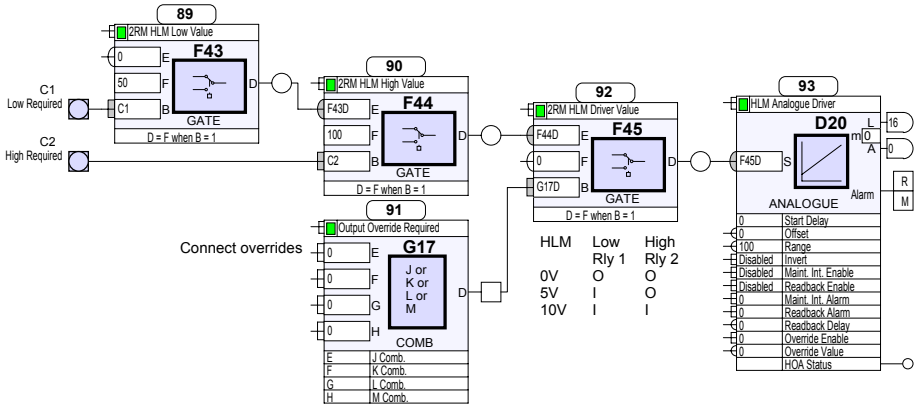
Note that the voltage levels shown in the switching tables are approximate values - exact switching points are lower and may vary slightly from unit to unit. Typical threshold values are shown in brackets

Strategy:
It is recommended to use SET (software toool) for configuring the controller. SET is suppied with 2RM strategy blocks for IQ1, IQ2, and IQ3 controllers. These can be used as they are or as examples.

There are 3 strategy blocks:

- HLM mode using analogue driver/analogue channel
- RLM mode using analogue driver/analogue channel
- RLM mode using R/L driver/analogue channel

These strategies are designed to apply the correct voltage to the 2RM module for the required action.



The above is an example strategy block; this strategy drives the 2RM in HLM mode via an analogue driver and analogue channel.

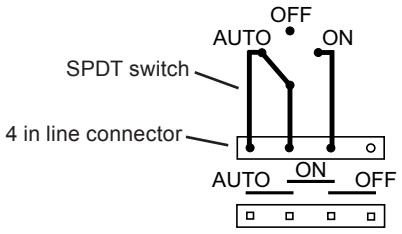
Mounting: The 2RM is designed to be mounted on a standard DIN rail.

Power connection: The relay's power connection is made to 24 Vdc (e.g IQ's auxiliary output supply) or 24 Vac supply (isolated or earthed, grounded, to IQ earth, ground) using the 0V and 24 V connectors.

AUTO/ON/OFF: For commissioning purposes each relay may be switched ON or OFF using it's AUTO/ON/OFF link. The relay operation may be checked by monitoring it's LED. Each AUTO/ ON/OFF link can be replaced with a SPDT switch.

Note that feeds switched from other relays on the same module or interlocks with other relays will not necessarily be operative when using manual overrides. It is the system designer's responsibility to ensure that adequate interlock protection is built into the design.

Connectors: 1 part screw terminals for 0.5 to 2.5mm^2 cross sectional area (14 to 20 AWG) cable are used for inputs, outputs, and power connection. The output terminals are rising cage clamp type. Each AUTO/ON/OFF link can be replaced by a 4 in line connector for connection of a switch.



INSTALLATION

The 2RM must be mounted within a secondary/protective enclosure, conforming to EN61010-1, close to the IQ controller. The procedure involves:

- Mounting the 2RM in position
- Setting HLM/RLM links
- Setting AUTO/ON/OFF links
- Seting IQ analogue output channel for voltage
- Wiring the 2RM to controller
- Wiring the 2RM to the HVAC equipment
- Connecting the 24 V input power supply
- Checking relay operation

The installation procedure is covered in the 2RM/24VAC Installation Instructions (TG200640).

DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF 2RM/24VAC. No parts are affected.

RECYCLING.
All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

WEEE Directive:
At the end of their useful life the packaging, product, and battery (if fitted) should be disposed of by a suitable recycling centre.
Do not dispose of with normal household waste.
Do not burn.

ORDER CODES

2RM/24VAC	:1 off 2RM module for DIN rail mounting.

SPECIFICATIONS

Electrical

Input power supply voltage
:24 Vdc or 24 Vac ±20%
Input power supply current
24 Vac :73 mA (37 mA for single relay)
24 Vdc :33 mA (17 mA for single relay)
Input signal :0 to 10 Vdc (10 mA max).
See operating voltage levels in text above
Relays
Switchng :2 single pole changeover.
Contacts :5 A @ 240 Vac (Cosø>=0.4)
5A @ 30 Vdc (resistive)
2 A @ 24 Vdc (inductive, T<=30ms).
NOTE: To meet safety requirements, relays being used must all be switching either low voltage or mains and not a mixture of voltages. If switching mains, they must all switch the same phase and polarity. Arc suppression circuit (RC) recommended for inductive loads, see TG200208. The UL rating applies to loads of up to 30 V.
Operating modes :linkable High/Low or Raise/Lower.
Manual override :linkable AUTO/ON/OFF.
LED :Single LED for each relay. ON when energised

IQ Configuration

It is recommended to use SET (software toool) for configuring the controller. SET is suppied with 2RM strategy blocks for IQ1, IQ2, IQ3 and IQ4 controllers. These can be used as they are or as examples- see text above for details

Mechanical

Dimensions :82 mm (3.23”) x 57 mm (2.24”) x 48 mm (1.89”).
Connections :Single part with rising cage clamp terminals for 0.5 to 2.5 mm^2 cross section area (20 to 14 AWG) cable. Use copper cable only.
DIN rail :Top hat profile DIN46277-3, EN50022, BS5584:1978

Environmental

Safety :EN61010-1:2001.
UL :The 2RM is UL rated as ‘UL916 listed accessory to open energy management equipment’.
Ambient limits
Storage :-10 °C (14 °F) to +70 °C (158 °F)
Operating :-10 °C (14 °F) to +50 °C (122 °F)
Humidity :0 to 90 %RH non-condensing
Altitude :<2000m (6562 ft)

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