

HARDWARE MANUAL

IHP24-A



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1 General

This manual covers the following products:

- IHP24-A-000001-C – No communication bus
- IHP24-A-100001-C – HART communication on control loop
- IHP24-A-300001-C – Foundation Fieldbus

1.1 Safety instructions

For a safe installation of a Val Controls device, the following must be observed. The module must be installed by qualified personnel who are familiar with the national and international laws, directives and standards that apply to this product as well as all instructions in this manual.

The information in this manual is subject to changes without notice.

1.2 Environment

Operating temperature: -30 to 80 °C

Storage temperature: -30 to 80 °C

Extended operating temperature¹: -40 to 85°C

Extended storage temperature¹: -55 to 100°C

¹ Please contact Val Controls

Relative Humidity: < 95% (No condensation)

The printed circuit boards are coated for tropical climate and harsh environments to resist airborne contamination according to G3, ISA-71.04-2013.

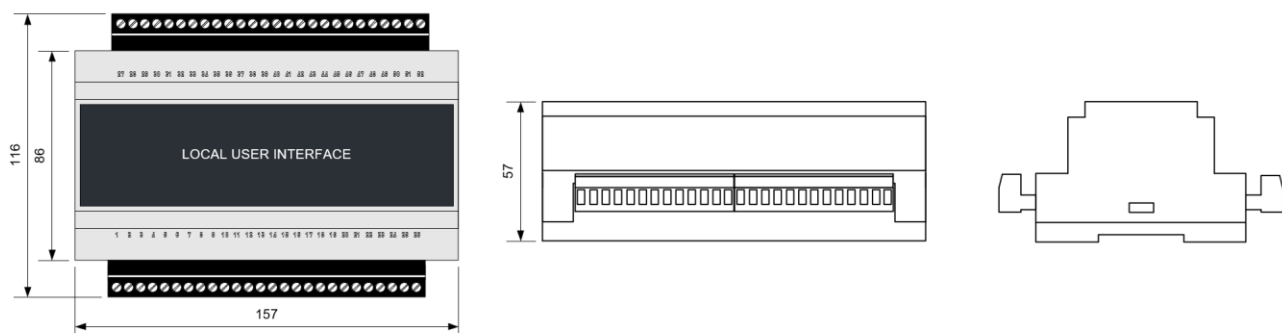
Ingress protection: IP20

1.3 Mounting and dimension

Mounting: 35mm DIN rail according to EN50022.

Screw torque: 0.4Nm (3.6Lb. in)

Wire diameter: AWG14-22 (0.5mm² til 2.5mm²)



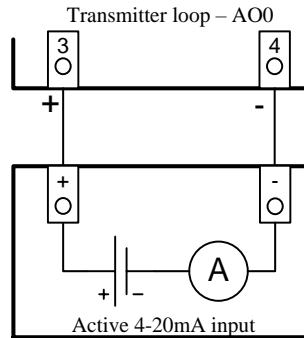
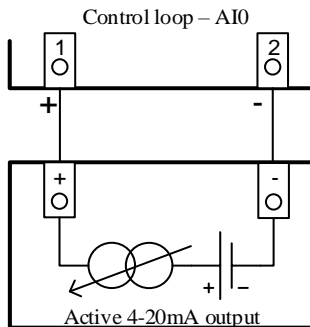
All external components must have specifications that fit the desired performance and requirements of the valve/actuator system.

2 Communication

Several communication types are available as options.

2.1 Control loop – AI0 and Transmitter loop – AO0

Passive 4-20mA input and passive 4-20mA output.



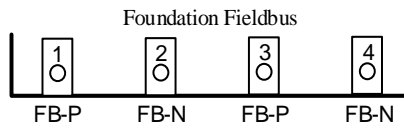
2.1.1 Terminals

AI0	1 (+) 2 (-)
AO0	3 (+) 4 (-)

2.1.2 Electrical specifications

Control loop – AI0	
Impedance	< 470 Ohm at 20mA and 9.4VDC
Linearity	< 0.1%
Temperature coefficient	0.025% / 1°C (Warm-up: 10 min)
HART (optional)	FSK, 1200Hz / 2200Hz 400-800mVpp
Galvanic isolated	
Transmitter loop – AO0	
Impedance	< 470 Ohm at 20mA and 9.4VDC
Linearity	< 0.1%
Temperature coefficient	0.015% / 1°C (Warm-up: 10 min)
Galvanic isolated	

2.2 Foundation Fieldbus



2.2.1 Terminals

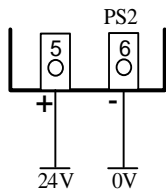
Foundation Fieldbus	1 (FB-P)
	2 (FB-N)
	3 (FB-P)
	4 (FB-N)

2.2.2 Electrical specifications

FF-Fieldbus	
Interface	FF-Fieldbus - H1 Device Class – Basic Device
Termination	No internal termination

3 Power supply – PS2

24VDC power input to the device.



Depending on device configuration, this power supply input may not be used.

3.1 Terminals

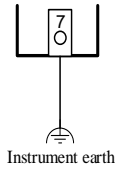
PS2	
	5 (+)
	6 (-)

3.2 Electrical specifications

Power supply – PS2	
Power supply	20.4 – 27.6VDC
Power dissipation, no position sensor/loop or valves are connected.	< 2W
Power dissipation, with maximum load on all inputs and outputs	< 5W

4 Earth

Device instrument earth terminal shall be connected to instrument earth bar at marshalling cabinet to avoid electromagnetic interference.

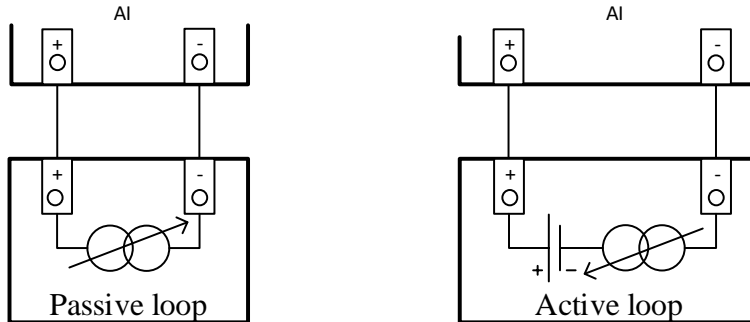


4.1 Terminal

IE	7 Instrument earth

5 4-20mA input – AI1, AI2, AI3, AI4, AI5

The analogue inputs can be used to connect passive 4-20mA sensors to the device or in the alternative configuration active 4-20mA sensors.



5.1 Terminals

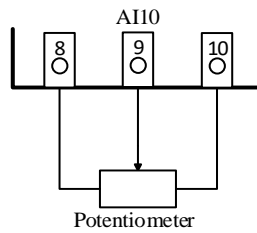
	Passive sensor	Active sensor
AI1	11 (+) 12 (-)	12 (+) 6 (-)
AI2	13 (+) 14 (-)	14 (+) 6 (-)
AI3	15 (+) 16 (-)	16 (+) 6 (-)
AI4	17 (+) 18 (-)	18 (+) 6 (-)
AI5	19 (+) 20 (-)	20 (+) 6 (-)

5.2 Electrical specifications

AI – Analogue inputs	
External loop max Rload	820 Ohm at 20mA and 16.4VDC
Operating area	4 – 20mA
Minimum span	12mA
Cable length	1000 meters
Linearity	< 0.1%
Temperature coefficient	0.01% / 1°C (Warm-up: 10 min)
Rin	< 100 Ohm

6 Position sensor – AI10

The position feedback can be delivered from a 3-wire potentiometer.



6.1 Terminals

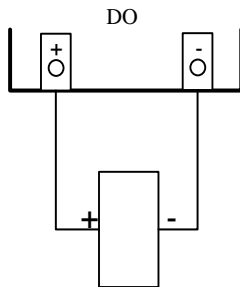
	Sensor
AI10	8 Pot high 9 Wiper 10 Pot low

6.2 Electrical specifications

AI10 – Position sensor	
Potentiometer size	5 k Ω to 20 k Ω
Minimum use operating area	40%
Cable length	1.5 meters
Linearity	< 0.1%
Temperature coefficient	0.01% / 1°C (Warm-up: 10 min)

7 Digital output – DO1, DO2, DO3, DO4, DO5, DO6

24 VDC digital outputs.



7.1 Terminals

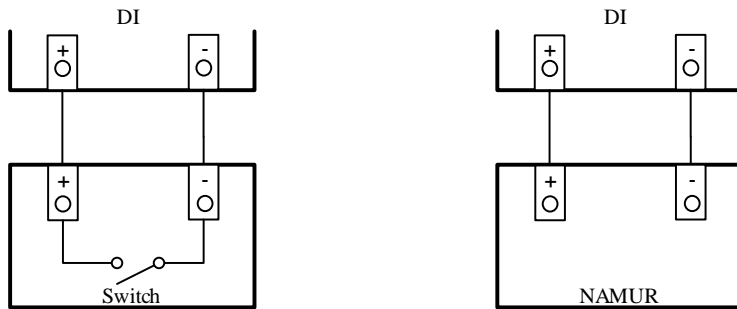
DO1	27 (+) 28 (-)
DO2	30 (+) 31 (-)
DO3	33 (+) 34 (-)
DO4	36 (+) 37 (-)
DO5	47 (+) 48 (-)
DO6	49 (+) 50 (-)

7.2 Electrical specifications

DO – Digital outputs	
Max load per digital output	up to 48W at 24VDC
Max load total	up to 192W at 24VDC

8 Digital input – DI1, DI2, DI3, DI4

Use digital inputs to connect dry signals.



8.1 Terminals

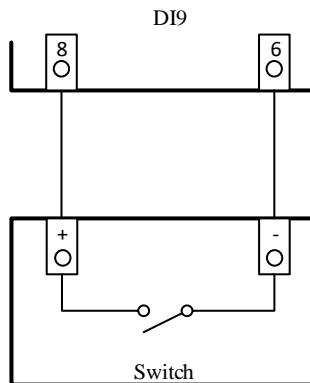
DI1	39 (+) 40 (-)
DI2	41 (+) 42 (-)
DI3	43 (+) 44 (-)
DI4	45 (+) 46 (-)

8.2 Electrical specifications

DI – Switch	
Type	Switch
Cable length	20 meters
Maximum cable resistance	100 Ohm
DI – NAMUR	
Type	NAMUR
Sensor supply voltage	8 V
Cable length	1000 meters
Max load	600 Ohm
Rin	1040 Ohm

9 Digital input – DI9

DI9 substitutes AI10



9.1 Terminals

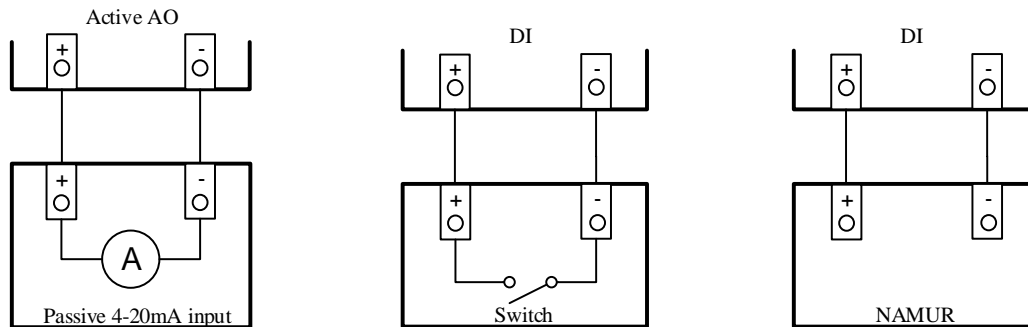
DI9	8 (+) 6 (-)

9.2 Electrical specifications

DI12	
Type	Switch
Cable length	1.5 meters

10 Active analogue output – AO1, AO2 and Digital inputs – DI5, DI6

Use the two analogue outputs to connect 4-20mA loop inputs e.g. proportional valves.



10.1 Terminals

AO1	21 (+) 22 (-)
AO2	23 (+) 24 (-)
DI5	51 (+) 52 (-)
DI6	25 (-) 26 (+)

10.2 Electrical specifications

AO1 – AO2 – Active analogue output	
Max load	550 Ohm at 20mA and 20.4VDC PS2 supply
Linearity	< 0.1%
Temperature coefficient	0.015% / 1°C (Warm-up: 10 min)
DI – Switch	
Type	Switch
Cable length	20 meters
Maximum cable resistance	100 Ohm
DI – NAMUR	
Type	NAMUR
Sensor supply voltage	8 V
Cable length	1000 meters
Max load	600 Ohm
Rin	1040 Ohm