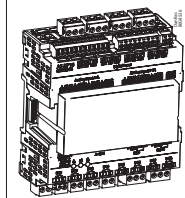


Installation Guide

Programmable controller

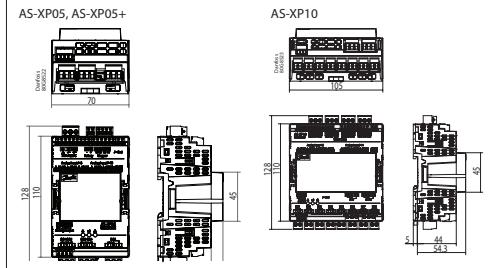
AS-XP05, XP10, PS20

1. Identification



AS-XP05 : 080G6014
AS-XP05+ : 080G6012
AS-XP10 : 080G6010
AS-PS20 : 080G6019

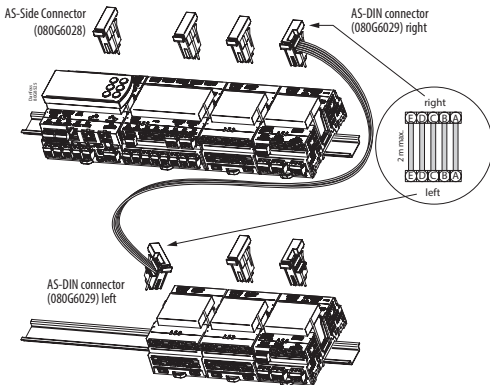
2. Dimensions



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Connection of modules



Before servicing the equipment, the controller and modules must be disconnected from the power mains.

Connect I/O expansion modules AS-XP05 and/or AS-XP10 and/or the external power supply AS-PS20 through the side connector (AS-Side Connector 080G6028) if you need to extend the number of Input/Output (I/O) of the main controller.

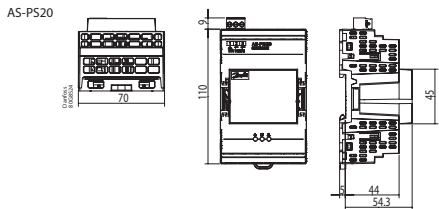
Fix the controllers on the DIN rail, place them close to each other and insert the Side Connector until it clicks.

Use the special side connector with screws (AS-DIN Connector 080G6029) if you need to extend I/O in more than one row and connect them as explained in figure. It is recommended to place the split before the AS-PS20 to keep the AS-PS20 and the powered units close to each other. Maximum cable length: 2 m.

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2. Dimensions (Continued)

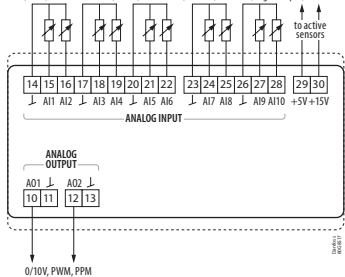


3. Connections

AS-XP05 and AS-XP05+

Top Board

0/1V, 0/5V, 0/5V Ratiometric, 0/10V, NTC 5k/10k, Pt1000, PTC 1000, Digital Input, 0/4-20mA

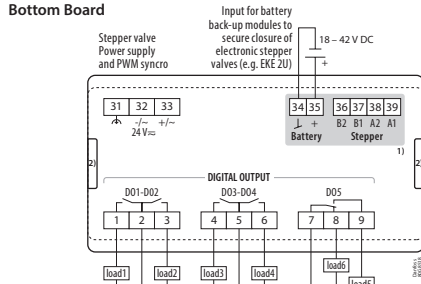


Note:
A11 – A110 can also be configured as Digital Input (DI).

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Bottom Board

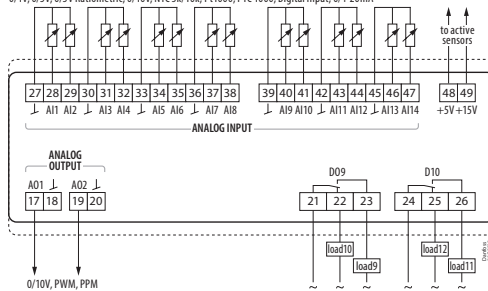


- 1) Available only on: AS-XP05+
- 2) Side-by-side connection to expansion modules for 080G6028-9 connectors.

AS-XP10

Top Board

0/1V, 0/5V, 0/5V Ratiometric, 0/10V, NTC 5k/10k, Pt1000, PTC 1000, Digital Input, 0/4-20mA



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4. Technical data

Electrical specifications AS-XP05, AS-XP05+ and AS-XP10

Electrical data	Value
Supply voltage AC/DC [V]	From the main controller
Power supply [W]	AS-XP05 5W (stepper motor current excluded). AS-XP10 6 W
Stepper motor supply voltage [V]	24 V AC/DC, 50/60 Hz ⁽¹⁾⁽²⁾
Stepper motor power supply [W]	12 W, min. 40 V A if transformer used ⁽³⁾
Electrical cable dimensioning [mm²]	0.2 – 2.5 mm² for 5 mm pitch connectors 0.14 – 1.5 mm² for 3.5 mm pitch connectors

⁽¹⁾ A higher DC voltage can be applied if the control is installed in an application where the manufacturer declares a reference standard and a voltage level for accessible SELV/PELV circuits to be considered non-hazardous by the application standard. That voltage level can be used as power supply input though 60 V DC must not be exceeded.

⁽²⁾ US: Class 2 < 100 VA

⁽³⁾ In short circuit condition DC power supply must be capable of supplying 7 A min. and 50 A max.

Input/Output specifications:

AS-XP05, AS-XP05+ and AS-XP10

Maximum cable length: 30 m

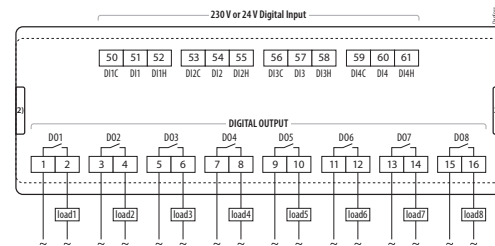
Analogue input:

Type	Feature	Data
For AS-XP05: A11, A12, A13, A14, A15, A16, A17, A18, A19, A110 For AS-XP10: A11, A12, A13, A14, A15, A16, A17, A18, A19, A110, A111, A112, A113, A114		
0/4-20 mA	Accuracy	±0.5% FS
	Resolution	1 µA
0/5 V Ratiometric	Relative to 5 V DC internal supply (10 – 90 %)	
	Accuracy	±0.4% FS
	Resolution	1 mV

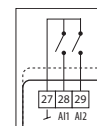
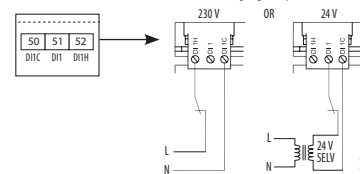
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Bottom Board



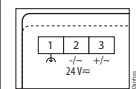
230 V or 24 V Digital input



Note:
A11 – A114 can also be configured as Digital Input (DI).

AS-PS20

Power supply



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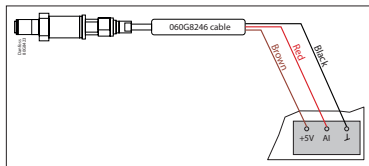
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The main controller is capable of powering autonomously one expansion module. You need to add one AS-PS20 for every four AS-XP05 or three AS-XP10 if you want to extend the I/O further.

The AS-CX main controller and any subsequent AS-PS20 and AS-XP stepper valve may be powered by the same power supply provided that the electrical specifications described in Chapter 4 and eventual end application requirements are met.

Pressure transmitter info

Example: DST P110 with ratio-metric output



ETS Stepper Valve info (only for AS-XP05+)

Valve cable connection

Maximum cable length: 30 m

CCMT / ETS Colibri® / KVS Colibri® / ETS / KVS

	Valve model	
	ETS 5M, ETS 8M, ETS 6	ETS, KVS, Colibri®, CCMT
AS-XP terminals	A1	Orange
	A2	Yellow
	B1	Red
	B2	Black
Valve cable		Danfoss M12 cable

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0 – 1 V 0 – 5 V 0 – 10 V	Accuracy	±0.5% FS (FS intended specifically for each type)
	Resolution	1 mV
	Input resistance	>100 kΩ
Pt1000	Meas. range	-60 to +180 °C
	Accuracy ⁽⁶⁾	±0.7 K [-20 to +60 °C], ±1 K otherwise
	Resolution	0.1 K
PTC1000 (PTC 990 Ω at 25 °C, e.g. EKS 111)	Meas. range	-60 to +80 °C
	Accuracy ⁽⁶⁾	±0.7 K [-20 to +60 °C], ±1 K otherwise
	Resolution	0.1 K
NTC10k (beta 3435 at 25/85 °C, e.g. EKS 221)	Meas. range	-50 to +160 °C
	Accuracy	±1 K [-30 to +160 °C]
	Resolution	0.1 K
NTC5k (beta 3980 at 25/100 °C, e.g. EKS 211)	Meas. range	-50 to +120 °C
	Accuracy	±1 K [-35 to +120 °C]
	Resolution	0.1 K
Digital Input	Stimulation	Voltage free contact
	Contact cleaning	20 mA
	Other feature	Pulse counting function 150 ms debounce time

⁽⁶⁾ For controller ambient temperature [-20 to +60 °C].

Aux power output

Type	Feature	Data
+5 V	+5 V DC	Sensor supply: 5 V DC / 80 mA
+15 V	+15 V DC	Sensor supply: 15 V DC / 120 mA

Digital input:

D11, D12, D13, D14 for AS-XP10

Type	Feature	Data
24 V AC	Stimulation	24 V AC +/-15%, 60 VDC
	Contact cleaning	2 mA @24 V AC
	Other feature	Pulse counting function max. 100 ms

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DI1H, DI2H, DI3H, DI4H for AS-XP10

Type	Feature	Data
230 V AC	Stimulation	86 – 265 V AC
	Contact cleaning	2.5 mA @265 V AC
	Other feature	Pulse counting function max. 100 ms

Analog output: AO1, AO2

Type	Feature	Data
0 – 10 V	Max. load per each output	15 mA
	Accuracy	Source: 0.5% FS Sink 0.5% FS for Vout > 0.5 V 2% FS whole range (I<=1 mA)
	Resolution	0.1% FS
Async PWM	Voltage output	Vout_Lo Max = 0.5 V Vout_Hi Min = 9 – 15 V
	Frequency range	15 Hz – 2 kHz
	Accuracy	1% FS
For AS-XP05 Sync PWM/PPM	Resolution	0.1% FS
	Voltage output	Vout_Lo Max = 0.5 V Vout_Hi Min = 9 – 15 V
	Frequency	Mains frequency x 2
	Resolution	0.1% FS

Digital output

Type	Data
For AS-XP05: DO1, DO2, DO3, DO4	
For AS-XP10: DO1, DO2, DO3, DO4, DO5, DO6, DO7, DO8	
Relay	SPST 3 A, 250 V AC, 50k cycles, resistive load 2 A, 250 V AC, 30k cycles, inductive load (φ 0.4)
For AS-XP05: DO5. For AS-XP10: DO9, DO10	
Relay	SPDT 3 A, 250 V AC, 50k cycles, resistive load 2 A, 250 V AC, 30k cycles, inductive load (φ 0.4)

For AS-XP05, isolation between relays in the DO1-DO4 group is functional and isolation between DO1-DO4 group and DO5 is reinforced.

For AS-XP10, isolation between relays in the DO1-DO8 group and in the DO9-DO10 group is functional and isolation between DO1-DO8 group and DO9-DO10 group is reinforced

Stepper motor output (for AS-XP05+): A1, A2, B1, B2	
Bipolar/Unipolar	Danfoss valves: - ETS / KVS / ETS C / KVS C / CCMT 2–CCMT 42 / CTR - ETS6 / CCMT 0 / CCMT 1 Other valves: - Speed 10 – 300 pps - Drive mode full step - 1/32 microstep - Max. peak phase current: 1 A (0.7 A RMS) - Output power: 10 W peak, 5 W average
Battery backup	V battery: 18 – 24 V DC ⁽²⁾ , max. power 11 W, min. capacity 0.1 Wh

Electrical specifications AS-PS20

Electrical data	Value
Supply voltage AC/DC [V]	24 V AC/DC, 50/60 Hz ⁽¹⁾⁽²⁾
Power supply [W]	26 W, min. 60 VA if transformer used ⁽³⁾
Electrical cable dimensioning [mm²]	1.0 – 2.5 mm² for 5 mm pitch connectors

⁽¹⁾ A higher DC voltage can be applied if the control is installed in an application where the manufacturer declares a reference standard and a voltage level for accessible SELV/PELV circuits to be considered non-hazardous by the application standard. That voltage level can be used as power supply input though 60 V DC must not be exceeded.

⁽²⁾ US: Class 2 < 100 VA

⁽³⁾ In short circuit condition DC power supply must be capable of supplying 7 A min. and 50 A max.

Function data

Function data	Value
LED	Green, Orange, Red LED controlled by software application
Mounting	DIN rail, vertical position
Plastic housing	Self extinguishing V0 and glowing/hot wire test at 960 °C. Ball test: 125 °C. Leakage current: ≥ 225 V according to IEC 60112
Type of control	To be integrated in Class I and/or II appliances
Type of action	1C
Pollution	Suitable for use in environments with degree of pollution 2
Period of electric stress across insulating	Long
Immunity against voltage surges	Category II
Software class and structure	Class A

Environmental condition

Environmental condition	Value
Ambient temperature range, operating [°C]	-40 to +70 °C UL: -40 to +65 °C
Ambient temperature range, transport [°C]	-40 to +80 °C
Enclosure rating IP	IP20
Relative humidity range [%]	5 – 90%, non-condensing
Max. installation height	2000 m

Electric noise

Cables for sensors, low voltage DI inputs and data communication must be kept separate from other electric cables:

- Use separate cable trays
- Keep a distance between cables of at least 10 cm
- Keep I/O cables as short as possible

Installation considerations

- Controller should only be installed, serviced and inspected by qualified personnel and in compliance with national and local regulations.
- Before servicing the equipment, the controller must be disconnected from the power mains by moving the system main switch to OFF.
- Using a supply voltage other than specified can seriously damage the system.
- All the safety extra low voltage connections (analogue and digital inputs, analogue outputs, serial bus connections, power supplies) must have proper insulation from the power mains.
- The connectors and the relevant cables must be physically protected for preventing malicious intrusions and manipulations.
- Avoid touching or nearly touching the electronic components mounted on the boards to avoid electrostatic discharges from the operator to the components, which may cause considerable damage.
- Do not press the screwdriver on the connectors with excessive force, to avoid damaging the controller.
- In order to ensure sufficient convection cooling we recommend not to obstruct ventilation openings.
- Accidental damage, poor installation, or site conditions can give rise to malfunctions of the control system, and ultimately lead to a plant breakdown.
- Every possible safeguard is incorporated into our products to prevent this. However, a wrong installation could still present problems. Electronic controls are no substitute for normal, good engineering practice.
- During installation ensure that proper method is made to prevent a wire to get loose and create a potential risk in regard to shock or fire.
- Danfoss will not be responsible for any goods, or plant components, damaged as a result of the above defects. It is the installer's responsibility to check the installation thoroughly, and to fit the necessary safety devices.
- Your local Danfoss agent will be pleased to assist with further advice.

Certificates, declarations, and approvals

Mark ⁽⁵⁾	Country
CE	EU
cULus (only for AS-PS20) (UL file E31024)	NAM (US and Canada)
cURus (UL file E31024)	NAM (US and Canada)

⁽⁵⁾ The list contains the main possible approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list. Some approvals may be still in progress and others may change over time. You can check the most current status at the links indicated below.



EU declaration of conformity can be found in the QR code.



Information about usage with flammable refrigerants and others can be found in Manufacturer Declaration in the QR code.

Any information, including, but not limited to information on selection of product, its application or use, product design, weight, dimensions, capacity or any other technical data in product manuals, catalogues descriptions, advertisements, etc. and whether made available in writing, orally, electronically, on line or via download, shall be considered informative, and is only binding if and to the extent, explicit reference is made in a quotation or order confirmation. Danfoss cannot accept any responsibility for possible errors in catalogues, brochures, videos and other material. Danfoss reserves the right to alter its products without notice. This also applies to products ordered but not delivered provided that such alterations can be made without changes to form, fit or function of the product. All trademarks in this material are property of Danfoss A/S or Danfoss group companies. Danfoss and the Danfoss logo are trademarks of Danfoss A/S. All rights reserved.