EP7416

16 Mixed I/O PIFA

EP7416 is a mixed I/O PIFA with 4 AO, 4 AI, 6 DI and 2 DO, for mounting in an EXOflex house. It is suitable for small applications with mixed I/O.

- **2 DI with standard functions, e.g. filtering, on-/off-delay, run-time measurement**
- **4 DI with advanced functions (pulse counting, frequency measuring etc.) and standard functions**

- **4 AI for individually selectable measurement ranges**
- **2 DO with standard functions, e.g. on-/off-delay, pulse-width modulation, frequency generation**
- **4 AO 0...10 V DC**

EP7416 is a 16 Mixed I/O PIFA. It is designed for use in general control applications. It has:

- 4 analog outputs of the type Standard AO.
- 4 analog inputs of the type Multisensor AI, also handling 0...20 mA transmitters.
- 6 digital inputs of the type Standard 24 V DC DI. 4 of the inputs are supplied with advanced software functions for pulse counting etc.
- 2 digital outputs of the type Standard 24 V DC DO.

EXOflex

EXOflex is a general system for control, regulation, supervision and communication in general automation installations. The system offers great possibilities when constructing many different types of control and regulation systems: outstations in distributed systems, controllers in building automation systems, service gateways in LANs and on the Internet, etc.

The system is of a modular design and provides unique opportunities for adapting the number and type of inputs and outputs required, as well as the type of communication needed.

EXOflex consists of a housing and a selection of PIFA units. One Power PIFA must always be present in each house.

Installation

EP7416 can generally be mounted in any of the compartments in an EXOflex house. It is of a standard design and size and can quickly and simply be slotted into place.

All electrical connections to external equipment are easily

attainable on plug-in screw connectors.

For more information on how to install PIFA:s, see the instruction for EH11-S...41-S / EH10-S...40-S / ECX2.

EP7416 handles difficult electrical environments

The process connections are, as a group, galvanically insulated from each other and from the internal control logic circuits by a protective barrier, which is bridged by optocouplers. If necessary, the isolation from other circuits can be retained by using a separate power supply. Each process connection has active transient protection, which is led to a special EMI ground (disturbance protection ground) or to protective ground. This provides for optimal handling of difficult electrical environments.
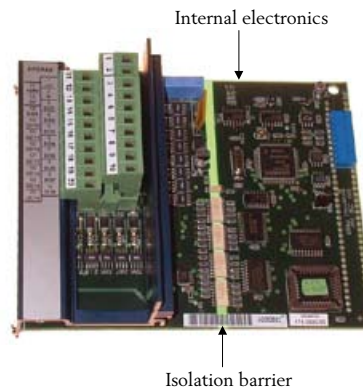
The principles of the isolation barrier

Prepared for redundant power supply

The parts of the PIFA closest to the process get their power from an external source, which is normally the same as the source supplying the whole EXOflex-unit with power. To handle power outage situations, it could also be power supplied from an alternative source, e. g. 9035 with external battery. *See the product sheets for EP1011 and 9035.*

Connections

- *Power supply*

  The EMI earth must be connected to the earth rail or equivalent, to prevent disturbances.

  The 0 V connection must also be grounded. This is normally done at the power unit's negative pole.

- *Standard AO*

  Each output is current limited and short circuit proof. This type of output is mainly intended for use with damper motors, shunt valves, frequency inverters and other analog actuators for 0...10 V.

  Process Connections
  Normal, high-ohm loads are connected between the output and AGnd. Other types of loads for special applications with low-ohm loads are best connected between the output and 0 V (terminal 15).

- *Multisensor AI*

  This type of input is mainly intended for use with sensors using voltage outputs and resistance elements or measuring temperature, pressure, flow, etc.

  In the range 0...20 mA, the internal current shunt resistor is activated by software-controlled electronic circuits. The shunt resistor has an active current limiter that limits the current to approximately 25 mA. However, the input voltage must not exceed 12 V on the input, as each input also has active transient protection that activates at this voltage level.

  All analog inputs have active transient protection that activates at an in-voltage of >12 V. This means that if you mistakenly allow 24 V on an input for longer than approx. 0.5 seconds the input will be permanently damaged and the guarantee will not be valid!

  If you connect an active transmitter (4...20 mA) and power it with 12 V, the analog input will not be damaged if the transmitter is mistakenly short-circuited.

  Process Connections
  Voltage signals are connected between the input and AGnd.

  The cable screen is connected to the connector SCR.

  The +C output is current limited. External transmitters for 4...20 mA can be powered from a +C output. A fast fuse should be fitted in serial with the transmitter to protect the input from short circuits in the transmitter.

  All AGnd are internally linked to each other and to 0 V (terminal 15). To attain maximum accuracy on analog input measurements and according to specifications, each respective AGnd should be used as a reference for each respective group of AI. As an example, the AGnd-connection 6 acts as an accurate reference for AI1 and AI2.

- *Standard 24 V DC DI*

  This type of input is used for reading of floating (potential free) contacts and is active high.

  A yellow LED for each input shows its current status.

  Process Connections
  The external contact's one end is connected to the input and the other to +C. The +C output is current limited and short circuit proof.

- *Standard 24 V DC DO*

  This type of current source output is mainly constructed for use with DC-relays, lamps etc.

  The outputs' driving stage is powered from the external supply

  Each output is current limited, short circuit protected and has overheat protection. Apart from the current limiting for each individual output, there is also total limiting for all of the outputs together.

  A yellow LED for each output shows its status.

  Process Connections
  An external load is connected between the output and -C.

Technical data

Supply voltage	24 V DC
tolerance	18...30 V DC
power consumption	max load: electronically fused to 1.1 A, no load: 80 mA
+C output for DI, level	= Supply voltage
max load	200 mA
internal power consumption	5 V, 70 mA

ϵ This product conforms with the requirements of European EMC standards CENELEC EN 61000-6-1 and EN 61000-6-3 and carries the CE-mark.

Analog outputs

Number of analog outputs	4
Basic resolution	11 bits
Output range	0...10 V
accuracy	±0.2% ±20 mV at max 1000 Ohm load
Max current	
on one output	20 mA, 10 V/500 Ohm
on all outputs simultaneously	40 mA, with 24 V stabilized supply voltage: 80 mA

Analog inputs

Number of analog inputs	4
Basic resolution	12 bits
Measurement range	individually configurable, determined by program parameters
Current	0...22 mA
input resistance	10 Ohm
current limit	24 mA (active up to 12V, then transient protection is activated)
accuracy (% of value)	±0,1 % ±20 uA
Temperature Ni1000, Pt1000	-50...150°C
accuracy (excluding sensor)	±0.2°C
Temperature Pt100	-50...150°C
accuracy (excluding sensor)	±0.3°C
Temperature Pt100, (extended range)	0...600°C
accuracy	±0.6°C
Voltage	0...10 V, 0...200 mV
input resistance	10 MOhm
accuracy (% of full scale)	±0.1%
Resistance	0...2000 Ohm
accuracy	±3 Ohm
+C output for feeding of sensor, level	= Supply voltage
current limit, electronically fused	200 mA

Digital inputs

Number of digital inputs	6
Input type 1–2	Normal
Input type 3–6	Advanced
Logic 0	0 to 5 V
input current at 0 V	0 mA
input resistance	5.7 kOhm
Logic 1	11...30 V
input current at +24 V	4 mA
Shortest pulse length for detection	
software type normal	9 ms
software type advanced	4.5 ms

Digital outputs

Number of digital outputs	2
Type	current source
Maximum total continuous load on both outputs	800 mA
Output voltage at logical zero	max 2 V/12 uA
Output current at +24 V (source)	
max continuous load per output	400 mA, at max. 30°C run temp: 500 mA
max transient load (20 ms)	min 1 A

Wiring

Pin no	Signal	Function
1	+C	+24 V DC. Output for analog inputs AI and digital inputs DI.
2	-C	0 V. Reference for analog outputs AO and digital outputs DO.
3	EMI ground	This terminal is connected internally to the PIFA's frame and to internal protective circuits. It should be connected to the ground rail with a separate, heavy wire.
4	AI1	Analog input 1, type Multisensor
5	AI2	Analog input 2, type Multisensor
6	AGnd	Reference pole for AI1 and AI2
7	SCR	Connection for screen, AI1 and AI2
8	AI3	Analog input 3, type Multisensor
9	AI4	Analog input 4, type Multisensor
10	AGnd	Reference pole for AI3 and AI4
11	SCR	Connection for screen, AI3 and AI4
12	AO1	Analog output 1, type Standard
13	AO2	Analog output 2, type Standard
14	+24V	Power supply +24 V DC
15	0 V	Power supply 0 V. The 0 V-connection is normally grounded at the supply source, so as to define the potential to earth reference and to compensate for disturbances and transients from I/O signals.
16	DO1	Digital output 1, type Standard 24 V DC
17	DO2	Digital output 2, type Standard 24 V DC
18	DI1	Digital input 1, type Standard 24 V DC
19	DI2	Digital input 2, type Standard 24 V DC
20	DI3	Digital input 3, type Standard 24 V DC
21	DI4	Digital input 4, type Standard 24 V DC
22	DI5	Digital input 5, type Standard 24 V DC
23	DI6	Digital input 6, type Standard 24 V DC
24	AO3	Analog output 3, type Standard
25	AO4	Analog output 4, type Standard
26	AGnd	Reference pole for AO1-AO4 for high-ohm loads. For low-ohm loads, use the 0 V terminal (20) as reference pole.

Analog input connections

Voltage and resistance measuring (PT100 etc.) is relative to AGnd. Screened cables must be used and the screens connected to the SCR-connector next to the input connection. Alternatively, the screen can be connected to the ground rail. In most cases, this alternative connection will give a measurement result that is accurate enough. However, in harsh electrical environments we recommend that the screen is connected to SCR. Power supply for transmitters etc. is from the fused +C output.

AGnd	Reference pole for analog inputs AI.
SCR	Connection for screen.

Analog output connections

For high-ohm loads, analog output voltages are referenced relative to AGnd. For low-ohm loads, use the 0 V terminal (20) as reference pole.

AGnd	Reference pole for analog outputs AO.

Product documentation

Document	Type
EH11-S...41-S / EH10-S...40-S / ECX2	Instruction for EXOflex houses and the EXOflex processor ECX2
EXO System Manual	Manual covering the EXO System

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THE CHALLENGER IN BUILDING AUTOMATION