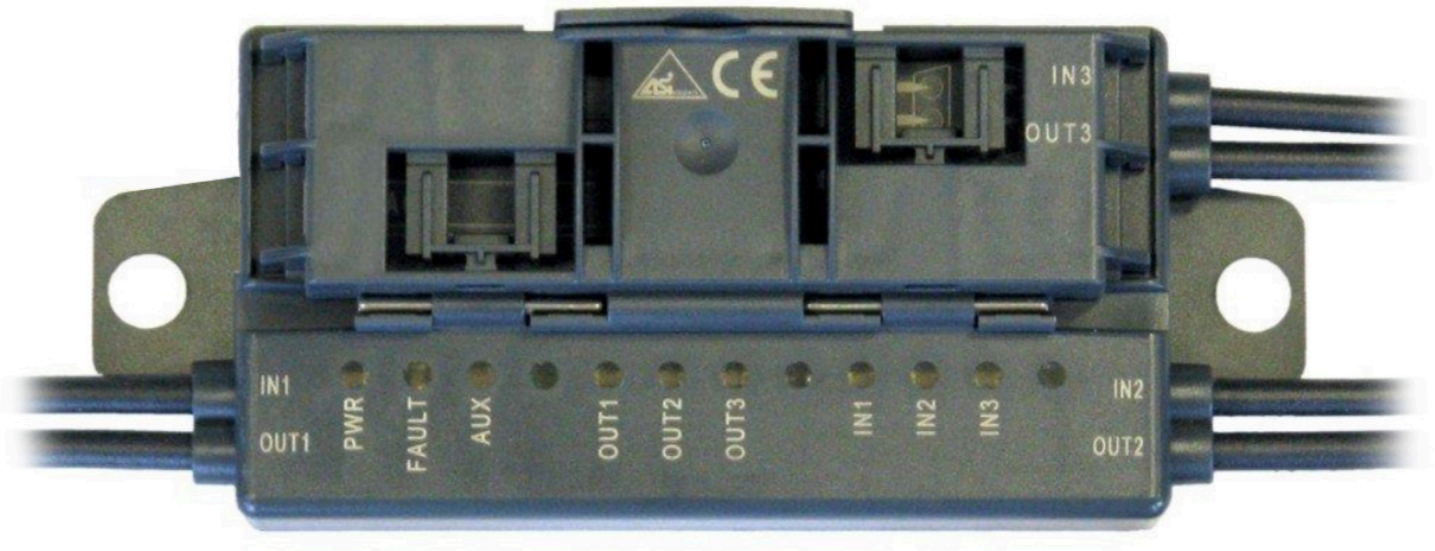
HILMOT

A TREW Company

3IN / 3OUT AS-I MODULE



INSTALLATION & MAINTENANCE MANUAL

11925 W Carmen Ave Milwaukee, WI 53225 **www.hilmot.com**

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SAFETY INSTRUCTIONS

Basic Safety Instructions

Maintenance and repairs should only be carried out by authorized service personnel. Lock the flat cable guide thoroughly to ensure tightness and reliable electrical contact. In operation do not disconnect or connect any connectors, do not unlock or lock the flat cable guide – machinery may start inadvertently

Scope of Application

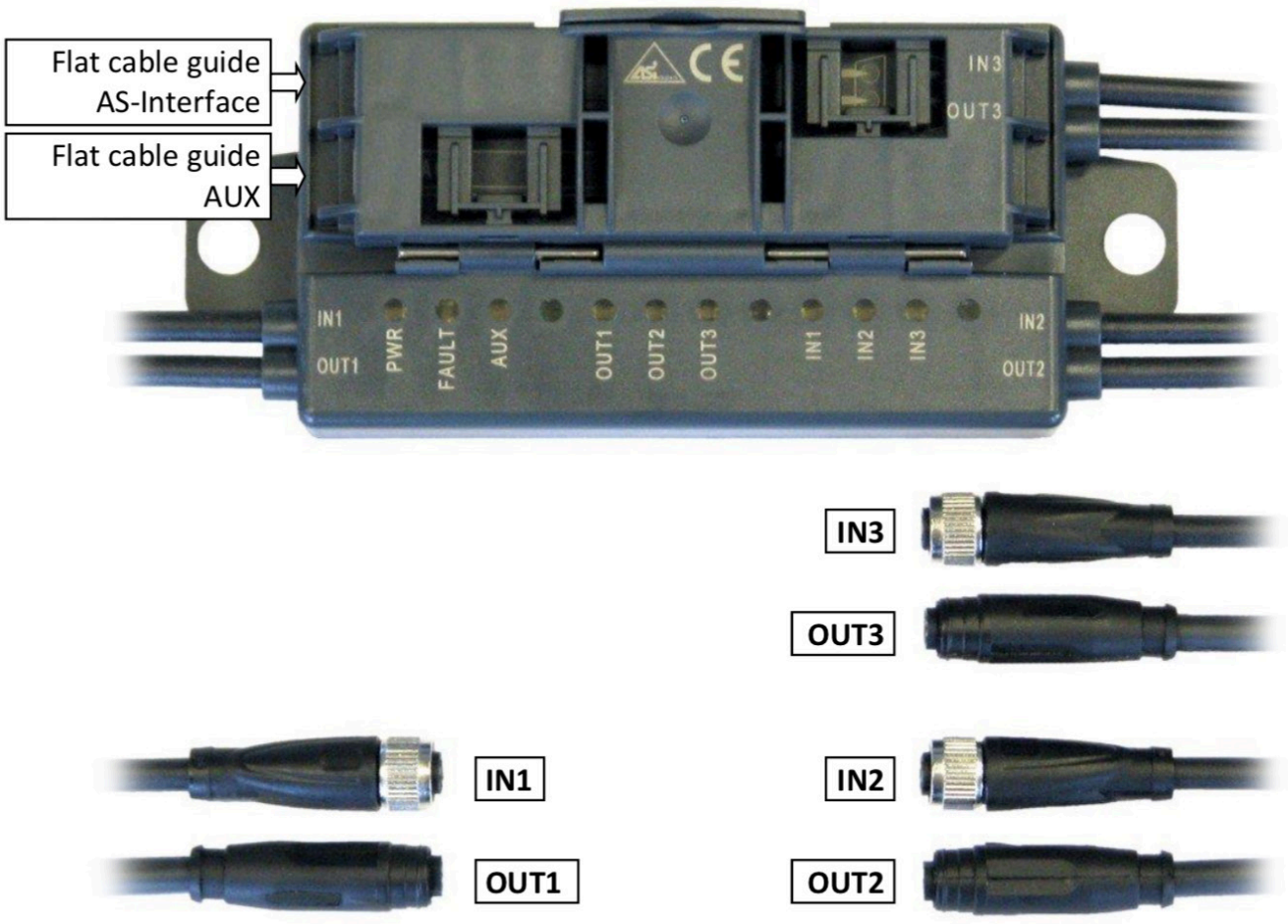
The AS-Interface digital I/O module facilitates switching of various loads via AS-Interface as well as connection of three-wire sensors or mechanical contacts to AS-Interface.

Make-up and Components

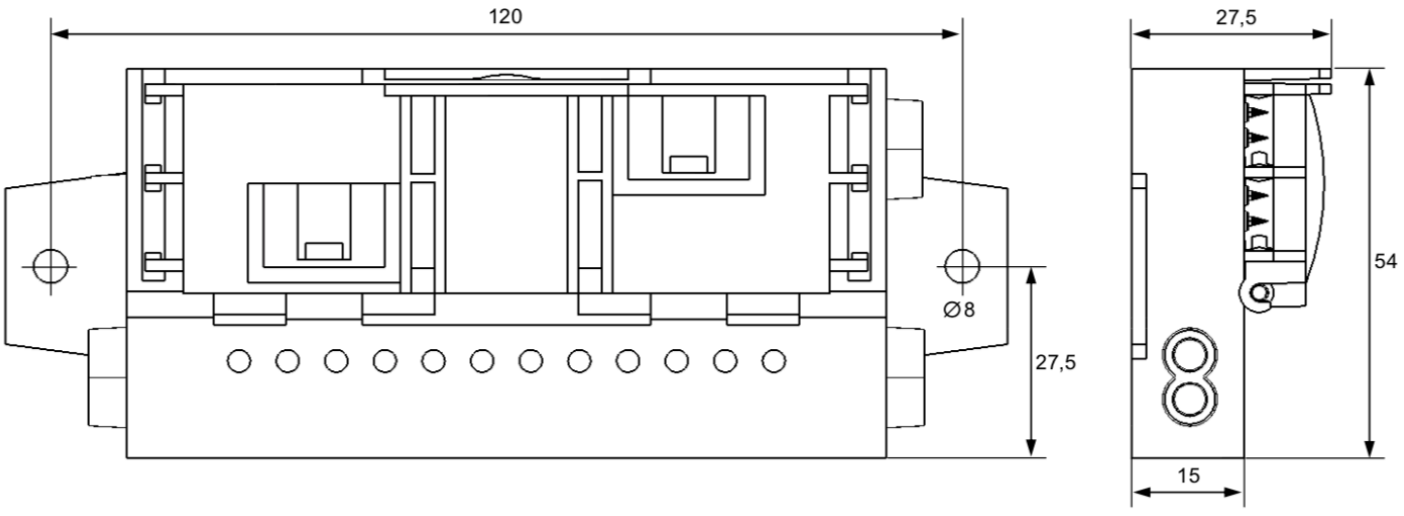
The AS-Interface digital I/O module is available as a version with three electronic outputs and three sensor inputs.

Note: Disposal
Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

GENERAL DESCRIPTION



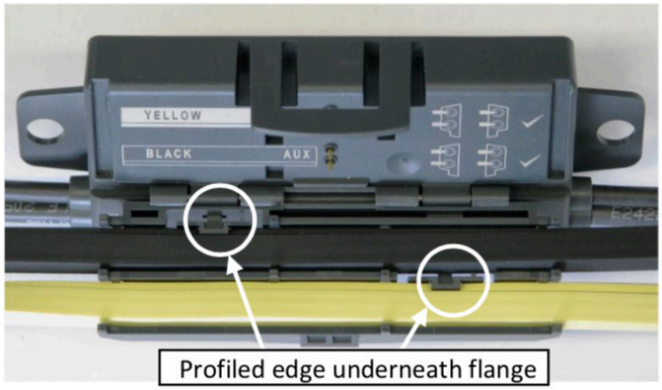
The housing consists of a main part, which contains the resin-encapsulated electronics, and a swivel- mounted guide for the AS-Interface flat cables. Except for the hinge pins of the flat cable guide, the housing is completely made of plastic material.



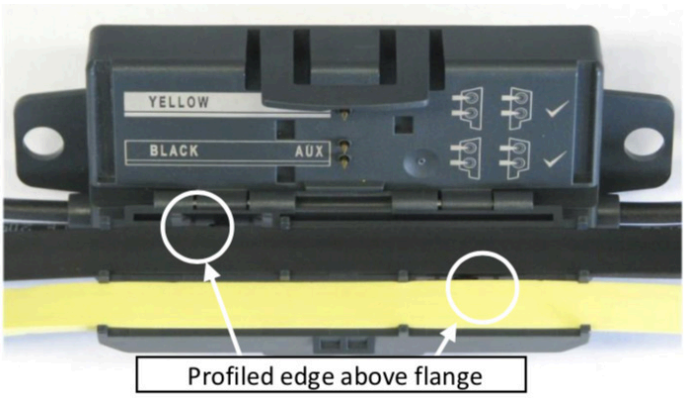
Connection

The connection to the AS-Interface network and power supply AUX is made by insulation piercing technology via AS-Interface flat cable. The flat cables are inserted into a swivel-mounted cable guide, which is locked by using a snap-fit. No tools are required to unlock the cable guide.

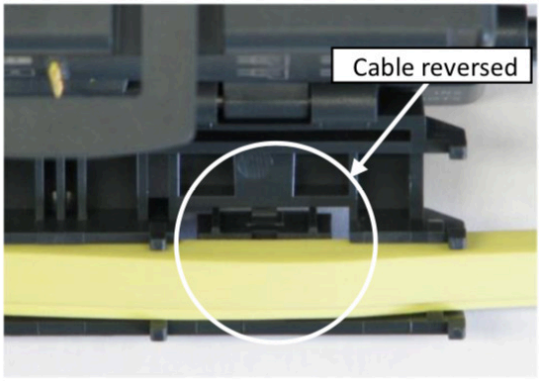
The cable guide facilitates to insert the cables in both directions, which means the cables can be connected to the module on either the wider (upper) side or the narrow (lower) side. The profiled edge of the cable must always point towards the module when looking onto the opened cable guide (as shown in the pictures below). A mechanical protection flange prevents fully locking of the cable guide in case the flat cables are inserted in the reverse direction.



Contacting on narrow (lower) side



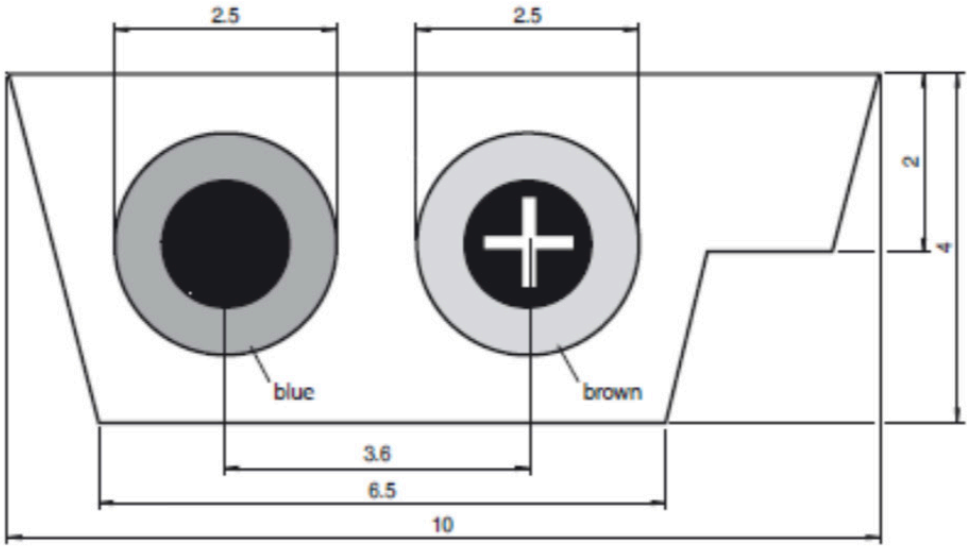
Contacting on wider (upper) side



Cable reversed - profiled edge on wrong side

Flat Cable Type Specification

The AS-Interface digital I/O module is compatible with "**AS-i standard cable**" specified by IEC 62026-2.



AS-i standard cable dimensions in mm

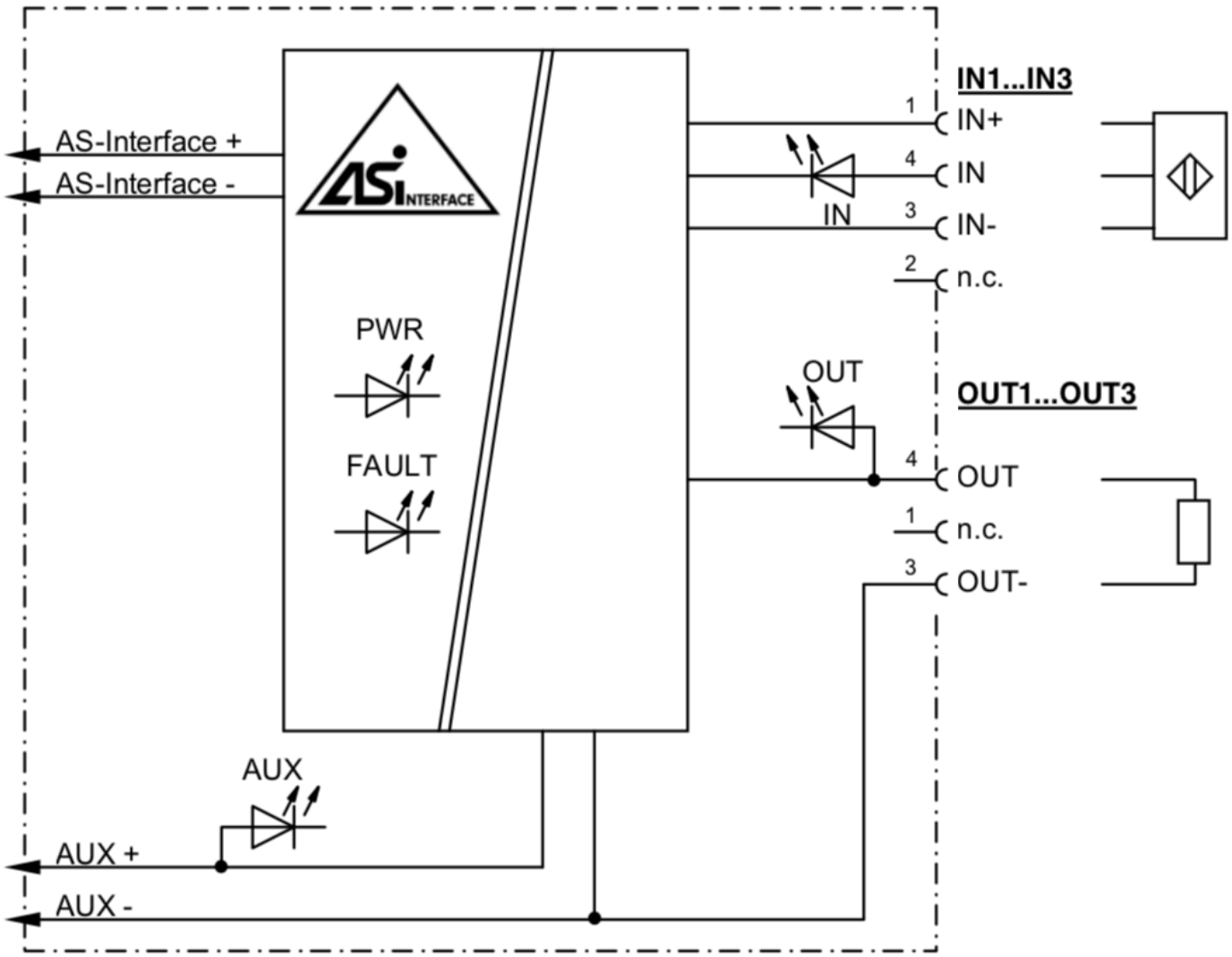
Approved AS-i cable available in the following styles:

P+F Type	Color	Material Jacket/Core	Cross-section	UL Cable Style	Approvals
VAZ-FK-R-YE	Yellow	TPE/TPE	2x 1.5 mm	2103	
VAZ-FK-R-BK	Black	TPE/TPE	2x 1.5 mm	2103	
VAZ-FK-PUR-YE	Yellow	PUR(TMPU)/TPM	2x 1.5 mm	20549	
VAZ-FK-PUR-BK	Black	PUR(TMPU)/TPM	2x 1.5 mm	20549	

Connection of Inputs & Outputs

The inputs and outputs are connected via cables with M8 round connectors (inputs 4-pole female cordset with knurled locking nut, outputs 3-pole snap-locking female cordset). The length of the cordsets is 1 m each.

Electrical Connection



Pin Out & Type of M8 Connectors

Input: LF004-GS1-A in accordance with IEC/EN 61076-2-104
(M8, 4-pole, female, locking nut, coding A):

1	Sensor supply IN+
2	n.c.
3	Sensor supply IN-
4	Input IN

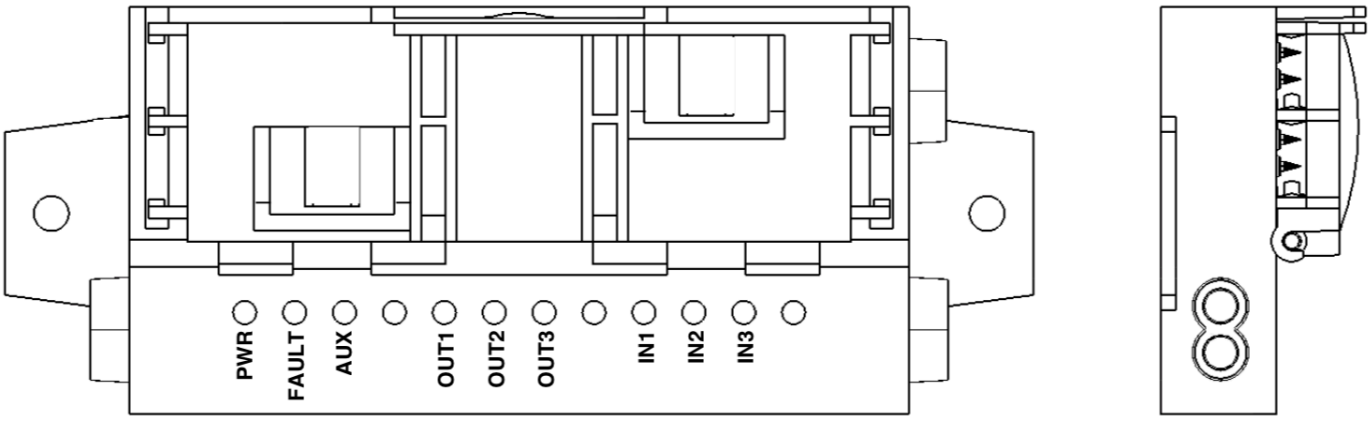
Mating connector: LM004-Gx1-A or similar

Output: NF003-SS1-A in accordance with IEC/EN 61076-2-104
(M8, 3-pole, female, snap locking, coding A):

1	n.c.
3	Output common OUT- (= AUX-)
4	Output OUT

Mating connector: NM003-Sx1-A or similar

Indicators



The operational state of the digital I/O module is indicated by 9 LEDs.
A detailed description can be found in section D. Function.

FUNCTION

General Description

With its three electronic outputs, the digital I/O module enables switching of various loads via AS- Interface. The three inputs of the module are suitable for connecting three-wire sensors (PNP) or mechanical contacts.

To begin operation, the digital I/O module must be connected to the AS-Interface network (yellow flat cable) and as well to the auxiliary power supply AUX (black flat cable). The actuators are to be connected to the three-pole M8 snap-lock connectors, and sensors are to be plugged to the four- pole M8 nut-locked connectors.

Peripheral fault

The digital I/O module indicates different fault conditions to the AS-Interface master via the accumulative AS-Interface peripheral fault indication. There is also an optical indication via LEDs PWR and FAULT.

These conditions will trigger the periphery fault indication:

- Auxiliary supply voltage AUX is not connected or is reversed
- Overload of sensor supply (IN+ to IN-)
- Overload of outputs OUT1...OUT3

AS-Interface & Auxiliary Supply Status Indicators

Besides the peripheral fault indication, the LEDs PWR and FAULT display further AS-Interface operational conditions:

LED PWR	LED FAULT	Status
🟢	⚫	AS-Interface communication ok
🟢/⚫	🔴	Address = 0
🟢	🔴	AS-Interface communication fault
🟢/⚫	⚫/🔴	Peripheral fault
⚫	⚫	AS-Interface supply voltage is missing

Table 1 Indication of AS-Interface operational conditions

LED AUX displays the status of auxiliary supply voltage AUX

LED AUX	Status
🟢	Auxiliary voltage AUX ok
🔴	AUX reversed
⚫	AUX is missing

Table 2 Indication of AUX operational conditions

Outputs (OUT1, OUT2, OUT3)

The supply for the outputs is provided by the auxiliary voltage AUX. The outputs are positive switching (PNP). They are capable of switching resistive loads as well as inductive loads or filament lamps.

The outputs are enabled by DO0 (for OUT1), DO1 (for OUT2) and DO2 (for OUT3).
In order to enable an output, the respective bit DO0...2 must be set to 1.
The switching state of the outputs is displayed by LED OUT1, OUT2 and OUT3.

Each output is capable of permanently sourcing 2 A. For ambient temperatures of 40°C and above the sum of the currents drawn from OU1 + OUT2 is limited to 3 A.

In case of an overload or short circuit the electronic output drivers will shut down. This condition is indicated via the peripheral fault function. After the overload condition has been removed, the output driver will restart and switch on again automatically, as long as the corresponding bit DO is still set to 1.

Due to the fact that the LEDs OUT1...3 are directly driven by the related output their brightness may be reduced depending on the severity of overload. If there is a full short on an output then the LED will be off.

DO0/DO1/DO2	Switching state of output	LED OUT1/2/3
0	Off	●
1	On	●

Table 3 Switching state of outputs against DO0...DO2

Note: The notation DO0...2 stands for AS-Interface output data (transmitted from master to slave), and DI0...2 means AS-Interface input data (transmitted from slave to master)

Sensor Inputs (IN1, IN2, IN3)

The inputs IN1, IN2 and IN3 may be connected to three-wire sensors with positive-switching output (PNP), and as well to mechanical contacts. The input characteristic is in accordance with EN 61131-2, Type 1. The supply voltage for the inputs (IN+, IN-) is provided by the auxiliary voltage AUX. It can be loaded with 500 mA in total. It is overload and short circuit proof by means of an electronic protection. An overload condition is indicated by the peripheral fault function.

The logical state of the inputs is transmitted to the master via AS-Interface data bits DI0 (for IN1), DI1 (for IN2) and DI2 (for IN3). Visual indicators are the LEDs IN1, IN2 and IN3.

DI0/DI1/DI2	Switching state of input	LED IN1/2/3
0	unattenuated, $I_{IN} \leq 0{,}5$ mA	●
1	attenuated, $I_{IN} \geq 2{,}0$ mA	●

Table 3 Switching state of outputs against DO0...DO2

AS-Interface Parameters (P0, P1, P2)

The AS-Interface parameter bits can control extended functions of the digital I/O module.

P0: AS-Interface communication monitoring (Watchdog)

Via parameter bit P0 the communication monitoring of the module can be activated or deactivated. If there is no AS-Interface communication for more than 40 ms while monitoring is active, then the outputs OUT1...OUT3 will be switched off.

P0	Communication monitoring
1	**Activated**; on communication failure the outputs OUT1...3 are switched off (default setting)
0	**Deactivated**; outputs OUT1...3 maintain their current state if communication fails

Table 5 Communication monitoring

P1: Input filter

Parameter P1 controls an input signal filter.
If the filter is activated, then all pulses with duration of 2 ms or less are suppressed.

P1	Input filter
1	**Deactivated**; input filter off (default setting)
0	**Activated**; input filter on

Table 6 Input filter

P2: Synchronous mode

If synchronous mode is activated, then all slaves in an AS-Interface network will update their inputs and output at the same instant of time. The data update takes place at the end of each bus cycle, when the last slave in that network (the one with the highest address) has finished it's communication with the master.

P2	Synchronous mode
1	**Deactivated**; normal cyclic data transfer (default setting)
0	**Activated**; synchronous mode on

Table 7 Synchronous mode

Indicator Lamps Summary

Indicator	Function	Display	
PWR	AS-Interface	green (FAULT off)	• AS-Interface ok
		green blinking (FAULT steadily on)	• Address set to 0
		green blinking (FAULT blinks alternating)	• Overload sensor supply • Overload outputs • Auxiliary voltage AUX missing
FAULT	Malfunction	red (PWR steadily on)	• No AS-Interface communication
		red (PWR blinking)	• Address set to 0
		red blinking (PWR blinks alternating)	• Overload sensor supply • Overload outputs • Auxiliary voltage AUX missing
AUX	Supply voltage AUX	green	• AUX ok
		red	• AUX reversed
OUT1 OUT2 OUT3	Outputs	yellow	• Output switched on
IN1 IN2 IN3	Inputs	yellow	• Input signal set 1 (high)

Table 8 Indicator lamps summary

SUPPORT

Support

If you need further assistance:

Website:
www.hilmot.com

Email:
support@hilmot.com

Phone:
(414) 446-4900
Monday - Friday, 8:00am - 5:00pm CT