EXD-U01 Universal Driver Module

Technical Bulletin

EXD-U01 Universal Driver Module enables the operation of EMERSON stepper motor driven valves EX4...EX8 & CX4…CX7 as:

- CX4…CX7: High pressure gas valve for flash tank (CO_2 transcritical)
- Bypass valve from flash tank (CO_2 transcritical)
- Capacity control by means of hot gas bypass or evaporating pressure regulator
- Crankcase pressure regulator
- Heat reclaim regulator
- Liquid level regulator

Features

- 4…20 mA or 0…10 V analog input signal
- Plug and run, no parameter setting i.e. automatic operation
- Easy configurable by Dip-switches
- Digital input for valve closure at any time
- Aluminum housing for DIN rail mounting
- Easy wiring
- Fully tested and ready for operation
- Compatible with EXD-U00

EXD-U01

Selection table

Type	Part No.	Description
EXD-U01	804750	Universal Driver Module without Terminal Kit
EXD-U01 Contr.Kit	808052	Universal Driver Module with Terminal Kit
K09-U00	804559	Terminal Kit for EXD-U01
ECP-024	804558	Uninterruptible power supply
K09-P00	804560	Electrical terminal kit for ECP-024

K09-U00   **ECP-024**   **K09_P00**

Function

The driver module EXD-U01 requires an analog input signal of 4…20 mA or 0…10 V. The output is the closing/opening of EX/CX valve series and consequently the control of liquid or vapor refrigerant mass flow in accordance with the analog input. The universal driver module can be connected to any controller which can provide a 4…20 mA or 0…10 V analog signal. This gives extreme flexibility to system manufacturers to use any desired controller and achieve different functionalities. The universal driver module keeps the valve at fully close position when the input signal is 4 mA or 0 V. The valve will be fully open at 20 mA or 10 V.
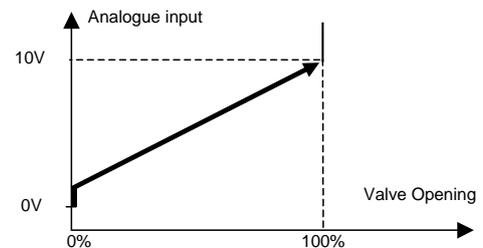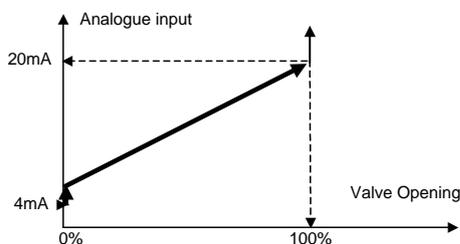
Optional uninterruptible power supply ECP-024

The optional uninterruptible power supply ECP-024 contains a rechargeable lead-acid battery, which provides enough energy to close the valve in case of power loss. ECP-024 can be connected to two EXD-U01 Driver Modules for closure of up to two valves.

EXD-U01 Universal Driver Module

Shut-off and Start/Stop command

EMERSON's stepper motor driven control valves of the EX- and CX-Series provide positive shut-off when they are driven to close position. The digital input allows closing the valve at any time independent of input signal.

Digital Input Function

Normally activation and deactivation of digital input is done parallel to the compressor ON/OFF; pump down function similar to a solenoid valve function.
The digital input status is dependent on operation of system.

Case	Operating condition	Digital input status
I	Compressor starts	24 V
	Compressor stops	0 V
II	Pump down initiation when no more cooling/heating needed	0 V while compressor operates
	End of pump down cycle	Keep 0 V after compressor stops

Pump down

EMERSON electronic valves can be driven to close position while the compressor is running for pump down function. The initiation and termination of pump down is within the system controller.

Configuration

Valve type and analog input need to be selected with the Dip-switches as per table and figure:
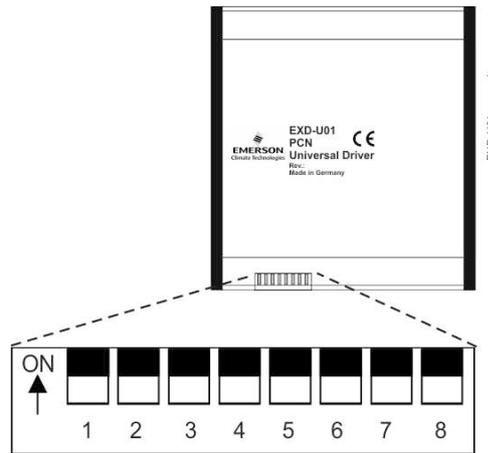
Valve / Analog Input	Dip Switch Number							
	1	2	3	4	5	6	7	8
EX4…6	OFF	ON	ON	OFF	ON	OFF	ON	-
CX4…6	OFF	ON	ON	OFF	ON	OFF	OFF	-
EX7	ON	OFF	OFF	ON	OFF	ON	ON	-
CX7	ON	OFF	OFF	ON	OFF	ON	OFF	-
EX8	ON	ON	OFF	ON	ON	ON	ON	-
4-20 mA	-	-	-	-	-	-	-	OFF
0-10 V	-	-	-	-	-	-	-	ON

Technical Data

Universal Driver Module EXD-U01

Supply voltage	24 VAC ±10%, 50-60 Hz
	Note: 24 VDC supply voltage can be used but it results to lower MOPD and it needs to be verified by system manufacture.
Supply current	to be protected by a 1.0 A external fuse
Power consumption	10 VA in conjunction with EXV
Temperature:	storage: -20…+65°C operating: 0…+60°C
Humidity	< 90% r.H. non condensing
Protection class	IP20
Approvals	EMC: EN 61326-1, EN50081, EN50082
Marking	CE, EHC

Analog input signal Burden	4-20 mA 364 Ω
Analog input signal	0-10 V
Impedance	27 kΩ
Digital input	24 VAC ±10%, 50-60 Hz 24 VDC ±10%
Connection to EX4…EX8	via 4 wires cable, AWG20/22
Connector	Screw terminals for wire size 0.5-2.5 mm^2
Mounting	DIN rail mounted
Housing	Aluminum

Optional Uninterruptible Power Supply ECP-024

Backup battery type	Lead acid gel rechargeable battery
Number of backup batteries	2, each 12 VDC, 0.8 Ah
Supply voltage	24 VAC ±10%, 50-60Hz
Output voltage, UB	18 VDC
Number of outputs to drivers	2
Battery recharge time	approximately 2 hours
Approvals	EMC EN 61326-1, EN50081, EN50082
Marking	CE

Temperature:	
storage operating	-20…+65°C -10…+60°C
Humidity	< 90% r.H. non condensing
Connection	Screw terminals for wire size 0.5-2.5 mm^2
Mounting	DIN rail mounted
Protection class	IP20
Housing	Aluminum

Application of EXD-U01 in CO₂ Booster systems

EXD-U01 in conjunction with CX and EX series provides various functions in CO_2 subcritical and transcritical systems.

Valve type	PS [bar]	PT [bar]	Duty/Application							
			Transcritical			Subcritical				
			High pressure gas valve	Heat reclaim	Hot gas	Bypass valve	Heat reclaim	Hot gas	Expansion valve	Suction
CX4…CX7	120	172	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
EX4…EX7	60	66	-	-	-	Yes	Yes	Yes	Yes	Yes
EX8	45	49.5	-	-	-	Yes	Yes	Yes	Yes	Yes
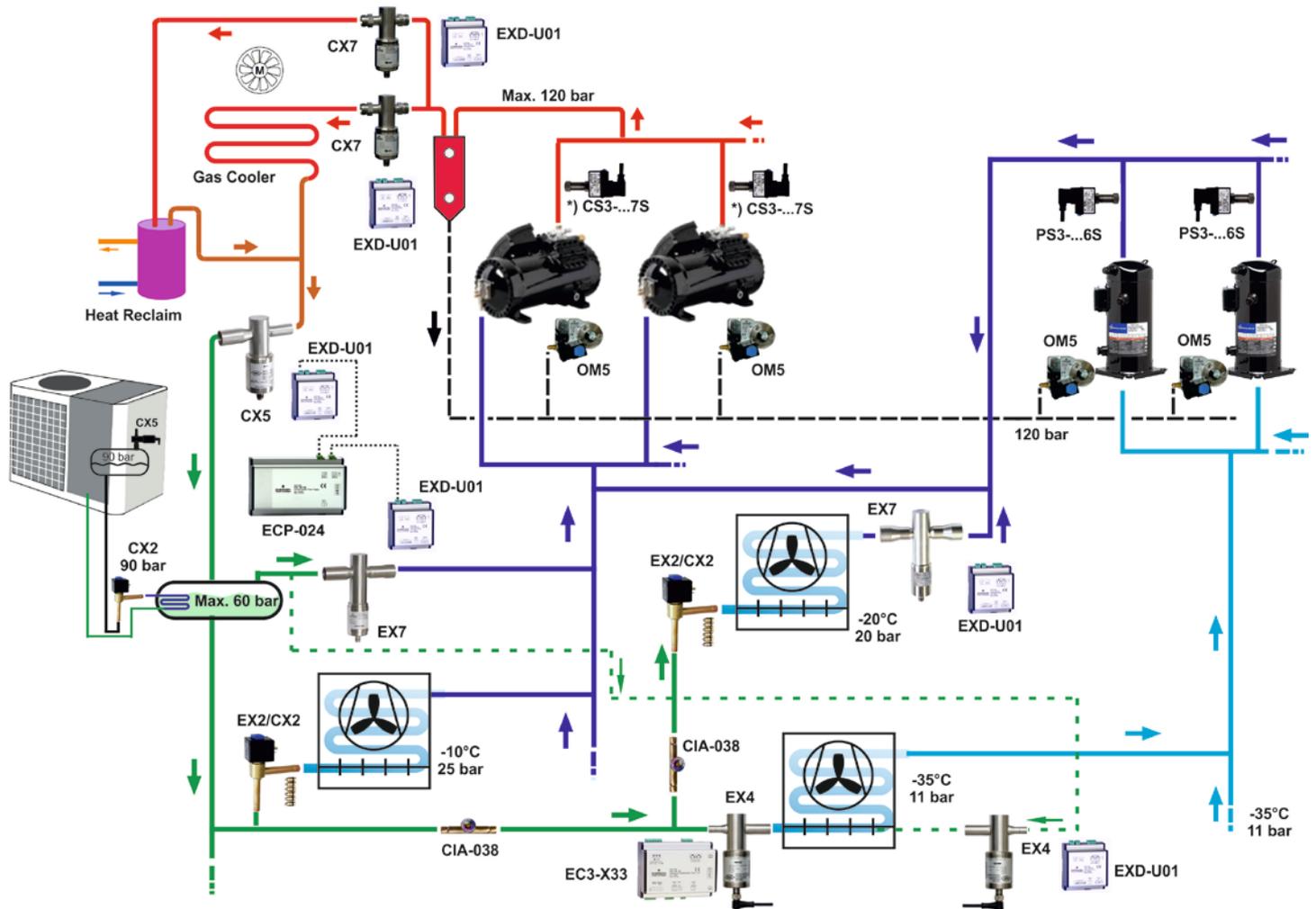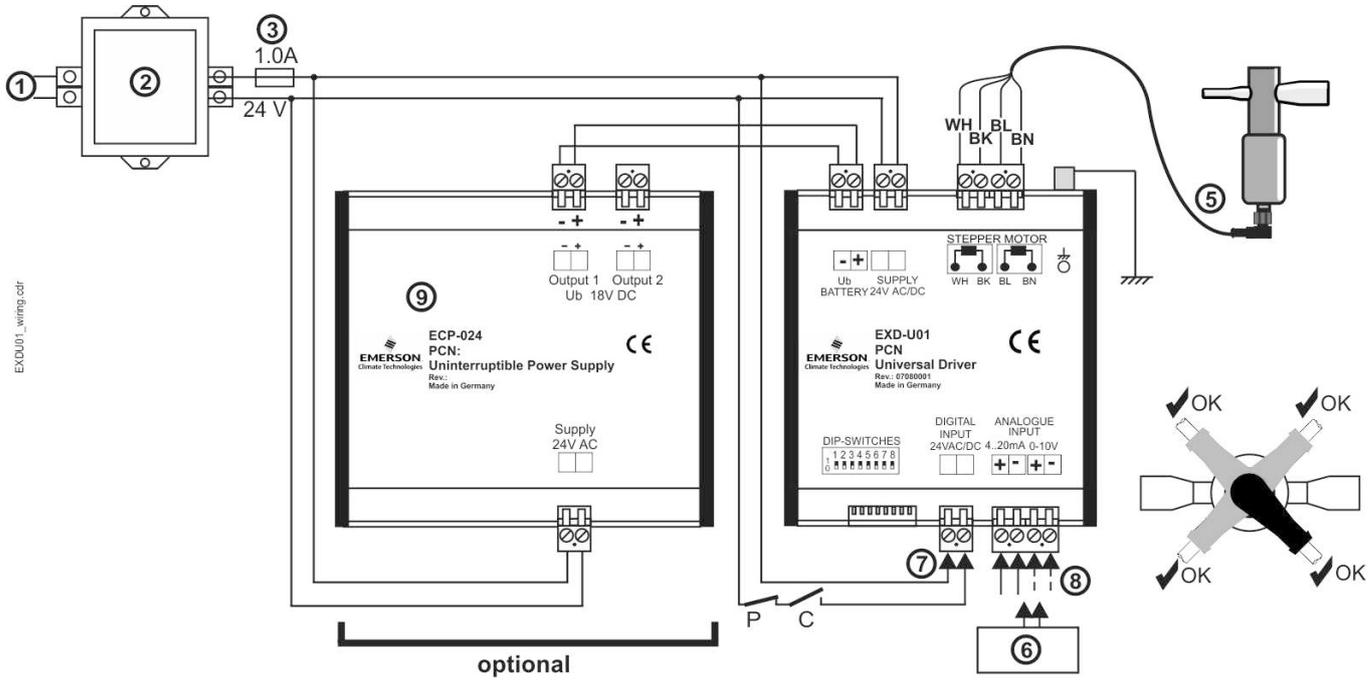
Wiring Diagram

Comments to numbering in the wiring diagram

1. Line voltage
2. Transformer
3. Fuse
5. Plug cable assembly EXV-Mxx for connection to EX4 … EX8; CX4 ... CX7
6. Controller supplies 4 … 20mA or 0 … 10V
7. Digital input signal (0V = OFF; 24V = ON)
8. Analog input signal (4 … 20mA or 0 … 10V)
9. Optional Uninterruptible Power Supply insures the closure of valve during power failures in systems, where a valve with positive shut-off function is needed

Cable Color Code

WH   White
BK   Black
BL   Blue
BN   Brown

Dimensions [mm]

EXD-U01

ECP-024

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