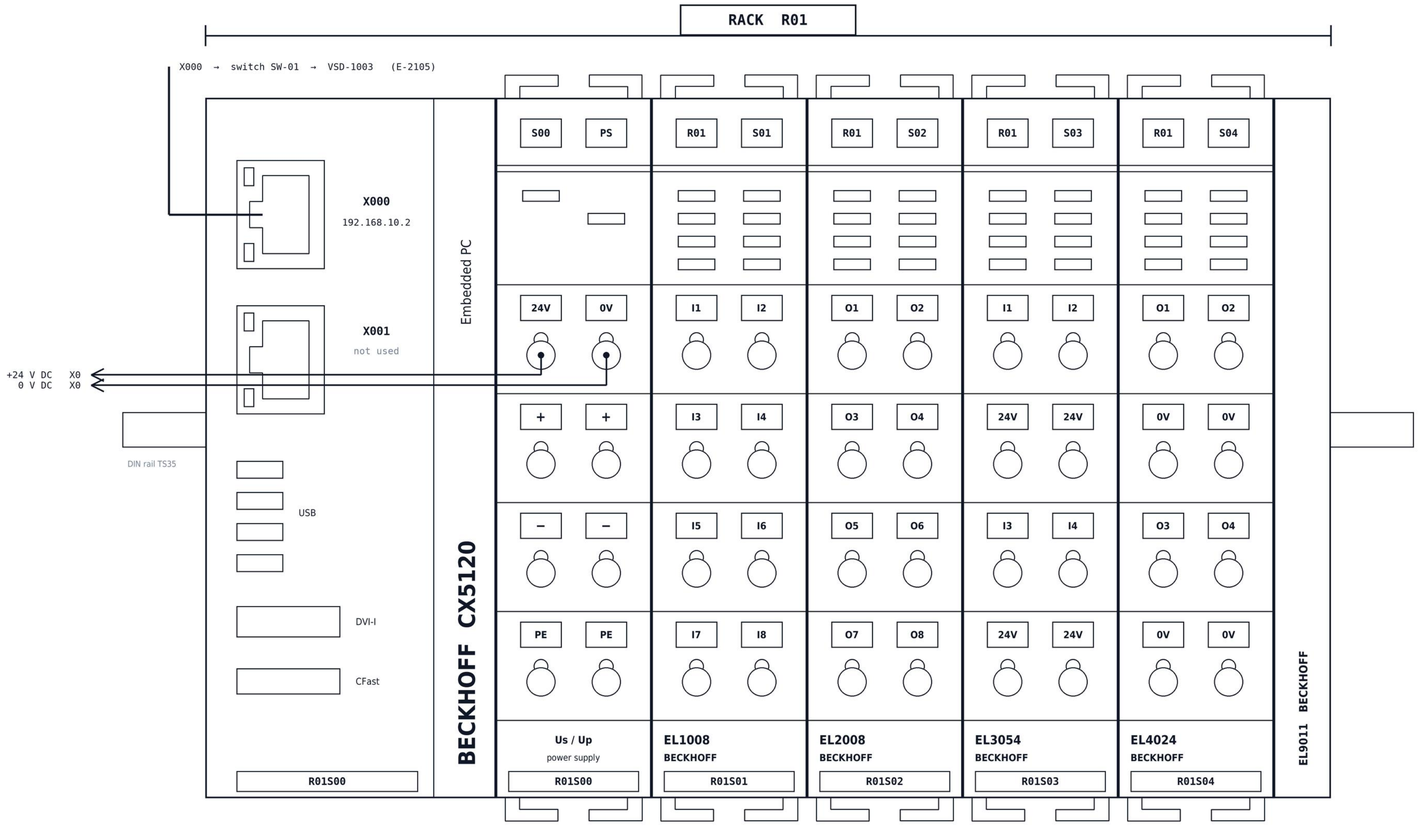

SLOT ALLOCATION

RACK	SLOT	REFERENCE	MODULE	FUNCTION	CHANNELS USED / SPARE	PLC ADDRESS RANGE (TwinCAT AT %)	DRAWING
R01	S00	R01S00	CX5120	Embedded PC, rack head, 24 V supply	–	–	E-2105
R01	S01	R01S01	EL1008	8 × digital input 24 V DC	4 / 4	%IX0.0 … %IX0.7	E-2101
R01	S02	R01S02	EL2008	8 × digital output 24 V DC 0.5 A	2 / 6	%QX0.0 … %QX0.7	E-2102
R01	S03	R01S03	EL3054	4 × analogue input 4-20 mA	2 / 2	%IW2 · %IW4 · %IW6 · %IW8	E-2103
R01	S04	R01S04	EL4024	4 × analogue output 4-20 mA	1 / 3	%QW2 · %QW4 · %QW6 · %QW8	E-2104
R01	END	–	EL9011	Bus end cap	–	–	–

NOTES

1. Every I/O module is identified by rack and slot: R01S03 = rack 01, slot 03.
2. Slot 00 is the rack head (CX5120).
3. Slots count left to right from the head. The EL9011 end cap takes no slot number.
4. Wire tags carry the reference: R01S01-1/X1-1 = rack 01, slot 01, point 1 to X1-1.
5. Channels are numbered 1 to n as printed on the terminal (Beckhoff convention).
6. PLC addresses are fixed with AT declarations in TwinCAT 3 and linked to the terminal process data. Each analogue channel takes one word.

VE-1001 WATER HEATING & DISTRIBUTION SKID

Example drawing for training purposes — not a real installation

MGTrace
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TRAINING EXAMPLE — FICTIONAL PLANT

PLC RACK R01 — LAYOUT & SLOT ALLOCATION

VE-1001 water heating & distribution skid · VE-1001-CP-01

DRAWING No. E-2100

REV 02

FIELD

VE-1001-CP-01

PANEL WIRING

X1

06-V-1004-00
LIMIT SWITCH VALVE OPEN
FILL VALVE XV-1004
CONTACT NO

ZSO 1004 — 14 / 13

CP01-X1-1/ZSO1004-14 — BLK — 1 — R01S01-1/X1-1
CP01-X1-2/ZSO1004-13 — BLU — 2 — X0-1/X1-2 — X0-1 +24 V DC

CABLE CP01-ZSO1004 2 Pr, Pr 1

ISOLATED GRD

06-V-1004-00
LIMIT SWITCH VALVE CLOSED
FILL VALVE XV-1004
CONTACT NO

ZSC 1004 — 14 / 13

CP01-X1-3/ZSC1004-14 — BLK — 3 — R01S01-5/X1-3
CP01-X1-4/ZSC1004-13 — BLU — 4 — X0-2/X1-4 — X0-2 +24 V DC

CABLE CP01-ZSC1004 2 Pr, Pr 1

ISOLATED GRD

06-T-1001-00
LEVEL SWITCH HIGH
VESSEL VE-1001
CONTACT NC

LSH 1005 — 12 / 11

CP01-X1-5/LSH1005-12 — BLK — 5 — R01S01-2/X1-5
CP01-X1-6/LSH1005-11 — BLU — 6 — X0-3/X1-6 — X0-3 +24 V DC

CABLE CP01-LSH1005 2 Pr, Pr 1

ISOLATED GRD

06-T-1001-00
LEVEL SWITCH LOW
VESSEL VE-1001
CONTACT NC

LSL 1006 — 12 / 11

CP01-X1-7/LSL1006-12 — BLK — 7 — R01S01-6/X1-7
CP01-X1-8/LSL1006-11 — BLU — 8 — X0-4/X1-8 — X0-4 +24 V DC

CABLE CP01-LSL1006 2 Pr, Pr 1

ISOLATED GRD

SPARE — pt 3 Ch 5
SPARE — pt 7 Ch 6
SPARE — pt 4 Ch 7
SPARE — pt 8 Ch 8

DIGITAL INPUT EL1008

TERMINAL	CH
pt 1 Ch 1	1
pt 5 Ch 2	2
pt 2 Ch 3	3
pt 6 Ch 4	4
pt 3 Ch 5	5
pt 7 Ch 6	6
pt 4 Ch 7	7
pt 8 Ch 8	8

RACK R01 · SLOT S01 · R01S01

NOTES

1. All field cable screened. Screen earthed at the CP-01 gland only.
2. Every wire is tagged origin/destination, origin on the CP-01 side.
3. Terminal reference R01S01 = rack 01, slot 01. Slot 00 is the CX5120 head. Rack layout and slot allocation on E-2100.
4. Spare channels are not wired. Terminal points available for future use.
5. EL1008 is a 1-wire system: the field supply comes from the panel 24 V distribution X0, not from the terminal.
6. Switch terminals to IEC 60947-5-1: 13/14 NO, 11/12 NC.

VE-1001 WATER HEATING & DISTRIBUTION SKID
Example drawing for training purposes — not a real installation

MGTrace
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TRAINING EXAMPLE — FICTIONAL PLANT

DIGITAL INPUT — WIRING SCHEMATIC

VE-1001 water heating & distribution skid · PLC rack R01 · CX5120

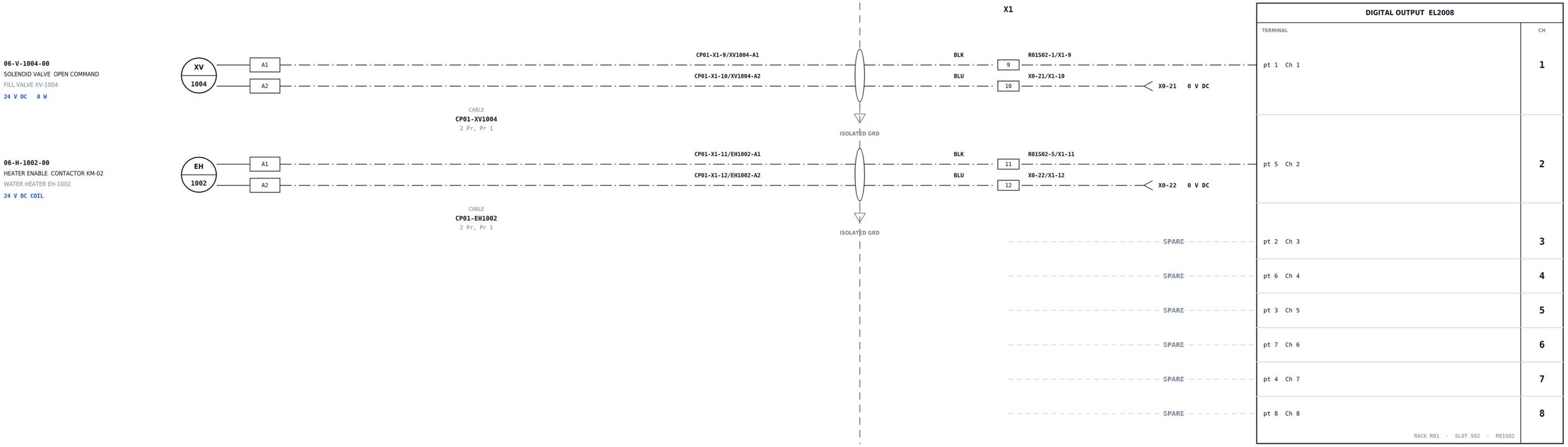
DRAWING No. E-2101

REV 02

FIELD

VE-1001-CP-01

PANEL WIRING



DIGITAL OUTPUT EL2008

TERMINAL	CH
pt 1 Ch 1	1
pt 5 Ch 2	2
pt 2 Ch 3	3
pt 6 Ch 4	4
pt 3 Ch 5	5
pt 7 Ch 6	6
pt 4 Ch 7	7
pt 8 Ch 8	8

RACK R01 · SLOT S02 · R01S02

NOTES

1. All field cable screened. Screen earthed at the CP-01 gland only.
2. Every wire is tagged origin/destination, origin on the CP-01 side.
3. Terminal reference R01S01 = rack 01, slot 01. Slot 00 is the CX5120 head. Rack layout and slot allocation on E-2100.
4. Spare channels are not wired. Terminal points available for future use.
5. EL2008 switches the +24 V side; the load returns to the panel 0 V distribution X0.
6. Contactor KM-02 power circuit on E-2301.

VE-1001 WATER HEATING & DISTRIBUTION SKID

Example drawing for training purposes — not a real installation

MGTrace
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TRAINING EXAMPLE — FICTIONAL PLANT

DIGITAL OUTPUT — WIRING SCHEMATIC

VE-1001 water heating & distribution skid · PLC rack R01 · CX5120

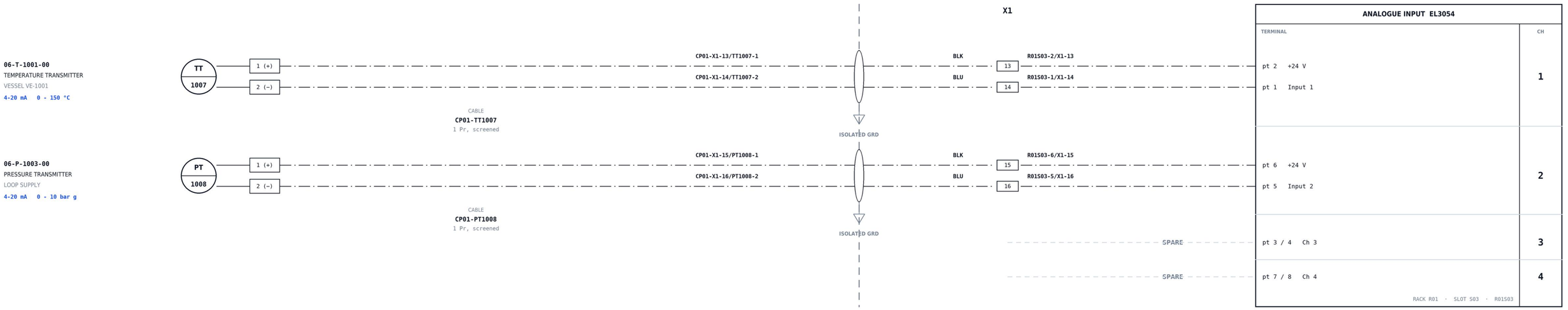
DRAWING No. E-2102

REV 02

FIELD

VE-1001-CP-01

PANEL WIRING



NOTES

1. All field cable screened. Screen earthed at the CP-01 gland only.
2. Every wire is tagged origin/destination, origin on the CP-01 side.
3. Terminal reference R01S01 = rack 01, slot 01. Slot 00 is the CX5120 head. Rack layout and slot allocation on E-2100.
4. Spare channels are not wired. Terminal points available for future use.
5. EL3054 is single-ended: the +24 V terminal point feeds the 2-wire transmitter and the Input point returns the 4-20 mA loop.

VE-1001 WATER HEATING & DISTRIBUTION SKID

Example drawing for training purposes — not a real installation

MGTrace
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TRAINING EXAMPLE — FICTIONAL PLANT

ANALOGUE INPUT — WIRING SCHEMATIC

VE-1001 water heating & distribution skid · PLC rack R01 · CX5120

DRAWING No. E-2103

REV 02

FIELD

VE-1001-CP-01

PANEL WIRING

06-H-1002-00
HEATER POWER DEMAND SCR UNIT
WATER HEATER EH-1002
4-20 mA 0 - 100 %

TY
1002

1 (+)
2 (–)

CABLE
CP01-TY1002
1 Pr, screened

CP01-X1-17/TY1002-1
CP01-X1-18/TY1002-2

ISOLATED GRD

X1

BLK 17 **R01S04-1/X1-17**
BLU 18 **R01S04-2/X1-18**

ANALOGUE OUTPUT EL4024

TERMINAL	CH
pt 1 Output 1 pt 2 0 V	1
pt 5 / 6 Ch 2	2
pt 3 / 4 Ch 3	3
pt 7 / 8 Ch 4	4

RACK R01 · SLOT S04 · R01S04

SPARE
SPARE
SPARE

NOTES

1. All field cable screened. Screen earthed at the CP-01 gland only.
2. Every wire is tagged origin/destination, origin on the CP-01 side.
3. Terminal reference R01S01 = rack 01, slot 01. Slot 00 is the CX5120 head. Rack layout and slot allocation on E-2100.
4. Spare channels are not wired. Terminal points available for future use.
5. SCR unit input is passive; the EL4024 sources the current.
6. EL4024 ground points 2, 4, 6 and 8 are internally commoned.

VE-1001 WATER HEATING & DISTRIBUTION SKID
Example drawing for training purposes — not a real installation

MGTrace
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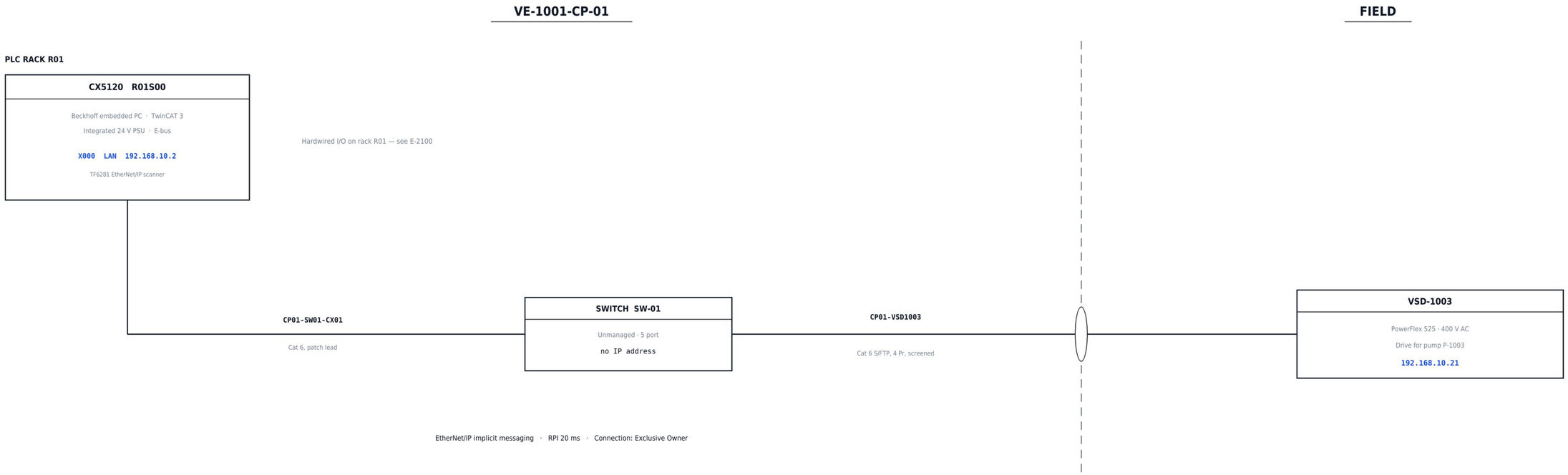
TRAINING EXAMPLE — FICTIONAL PLANT

ANALOGUE OUTPUT — WIRING SCHEMATIC

VE-1001 water heating & distribution skid · PLC rack R01 · CX5120

DRAWING No. **E-2104**

REV **02**



VSD-1003 — CYCLIC DATA MAP

TAG	DIRECTION	DESCRIPTION	DATA TYPE	ENG. RANGE	TWINCAT VARIABLE	NOTE
P-1003	PLC → VSD	Pump start / stop command	BOOL	0 = stop, 1 = run	**GVL.VSD1003.Cmd.Start**	Interlocked with LSL-1006
SC-1003	PLC → VSD	Pump speed setpoint	INT	0 - 1450 rpm	**GVL.VSD1003.Cmd.Ref**	Scaling configured in the drive
SI-1003	VSD → PLC	Pump speed feedback	INT	0 - 1450 rpm	**GVL.VSD1003.Sts.Fb**	Scaling configured in the drive
YS-1003	VSD → PLC	Pump running status	BOOL	1 = running	**GVL.VSD1003.Sts.Active**	—
YA-1003	VSD → PLC	Drive fault	BOOL	1 = faulted	**GVL.VSD1003.Sts.Faulted**	Latched until reset

NOTES

1. Hardwired I/O is on rack R01 — layout on E-2100, wiring on E-2101 to E-2104.
2. Pump P-1003 has no hardwired I/O. Start, stop, setpoint and feedback are exchanged over EtherNet/IP only.
3. Speed scaling is configured in the drive, not in the PLC.
4. On loss of communication the drive is configured to coast to stop.

VE-1001 WATER HEATING & DISTRIBUTION SKID

Example drawing for training purposes — not a real installation

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TRAINING EXAMPLE — FICTIONAL PLANT

NETWORK — PLC RACK R01 & VSD DATA MAP

VE-1001 water heating & distribution skid · Pump P-1003

DRAWING No. E-2105

REV 03