

TECOMAT TC700 – CPU for redundancy

Type	CP-7005
Ethernet 10/ 100 Mbps	No, can be provided by additional SC-7104 module
Serial port slots	No, can be provided by additional SC-7104 or SC-7103 module
USB port	Yes

Basic features of CP-7005

- Powerful CPU of TC700 programmable controller (PLC) according to IEC EN 61131.
- CP-7005 is equipped with the firmware to enable redundant parallel work of 2 CPUs in the Hot- Standby mode.
- CP-7005 enables the configuration of the TC700 PLC with redundant CPU, redundant power supply, redundant communication with host system as well as redundant communication with I/O modules.
- To work TC700 fully redundant, two independent racks – usually RM-7942 - must be equipped by two CP-7005, two power supplies, two SE-7131 system expanders for communication with I/O system, two or more communication modules SC-710x for communication with the host system – SCADA or similar.
- Under each rack/each CP-7005 there can be up to 4 racks of I/O modules connected. It enables to work with redundant I/O modules. Proper electrical wiring of inputs and outputs has to be ensured in the electrical design of the project.
- Racks with I/O modules are connected using system expanders SE-7131/32. They enable the proper redundant work of two CP-7005 over the single I/O system.
- Both CP-7005 are interconnected by 2 synchronization lines and connected to the ID-20 service module.
- ID-20 service module indicates the status of each CPU in the redundant configuration and enables proper handling the system during service work to avoid any drop out and ensure continual work of PLC.
- Ethernet and 2 serial channels on CPU are fully dedicated to synchronize both CP-7005 and they cannot be used in application program.
- To expand number of communication channels - Ethernet and serial – additional modules SC-710x has to be added together with each CP-7005 in their racks. They can be used fully in the user program.
- The redundant CP-7005s synchronize automatically all working memory including program memory. This feature enables to program only one (hot) CP-7005 through the USB port. Program in next CP-7005 (standby) is immediately copied in next synchronization cycle.

CPU programming features

- Free programmable according IEC EN 61131-3.
- All type instructions can be used as in other CP-700x, including arithmetic functions, floating point instructions, PID loop control etc.

- On-line programming. With the full check of program and variables integrity including changing data types.

Basic features of system expanders SE-7131 (master) and SE-7132 (slave)

- System expanders SE-7131/32 enables to connect I/O system via quick Ethernet line. Only dedicated Ethernet line can be used, since the band of this line is used fully for I/O operations.
- Twin system expanders work together as Master-Slave and also support redundancy.
- They enable to connect single I/O system placed in up to 4 racks full of I/O modules which are controlled by two CP-7005 working in Hot-Standby mode.
- Each CP-7005 has one SE-7131 Master in its rack. Their SE-7132 Slaves are placed in the same I/O rack. The SE-7132 slaves ensure proper handling the system bus in I/O racks during changing the control work from one CP-7005 (Hot) to the other one (Standby) and vice versa.

Connecting

- To create redundant configuration, at least 2 independent racks have to be used and one ID-20 service module.
- Each rack has at least one power supply module PW-790x and one CP-7005.
- Both CP-7005 are interconnected by 2 synchronizing lines. Each CP-7005 has to be connected to ID-20 by RCP1 interface placed in CH2 slot.
- Each power supply module has to be connected to the main power through ID-20 to be properly maintained during service work.
- To provide redundant communication with the host system, SC-7104 has to be placed in each rack. Their Ethernet ports are configured properly. The OPC server or SCADA system Reliance automatically select the active channel for uninterrupted communication.

Use

- Can be used as powerful redundant PLC with the high grade of availability in machinery, process, building or transport automation tasks.

Basic features of CPU	CP-7005
CPU:	High speed 32 bit RISC processor
PLC Instruction cycle:	0.9 ms/ 1k instructions
Real Time Clock (RTC):	Yes
Backup period of RAM and RTC:	< 100h by supercap > 100h up to 5 years by CR2032 lithium battery
User Program Memory:	128 kB
User Tables Memory	64 kB
Backup memory for user program and tables	192 kB Flash
Internal data memory (DataBox):	2.5 MB onboard
Internal memory for archiving the project resources:	2 MB
Memory card slot:	No
Memory for variables:	64 kB/ 32 kB permanent
No. of IEC timers/ counters:	4096/ 8192

Communication	CP-7005
Ethernet port:	No
Expanding the number of Ethernet ports:	See SC-7104
USB port:	USB 2.0
Serial ports:	The onboard slots used for redundancy support. Next ports can be added by SC-7103 or 7104.
Max. number of expanding serial ports (by SC-7103 or SC-7104):	8
System communication bus available within one rack:	1× TCL1 (RS485, 5 Mbit/s)
System I/O bus expandable among the racks:	1× TCL2 (RS485, 345 kbit/s)
Max. number of racks with I/O modules	4 racks with 15 positions or equivalent number of smaller racks/ 64 modules



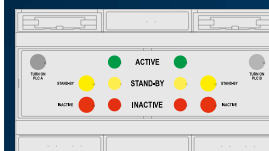
CP-7005



SE-7131



SE-7132



ID-20

System expanders	SE-7131 Master	SE-7132 Slave
Ethernet port:	Yes, only for communication with SE-7132	Yes, only for communication with SE-7131
Serial ports:	No	No
Number of expanding serial ports (by SC-7103 or SC-7104):		8 within the same rack, where SE-7132 is placed
System I/O bus expandable among the racks:	SE-7131 pass system buses TCL1 and TCL2 through the Ethernet line to the SE-71321	SE-7132 converts Ethernet packets received form SE-7131 back to the TCL1 and TCL2 system buses for racks with I/ O

Dimensions and Weight	CP-7005	SE-7131	SE-7132
Dimensions	137 × 30 × 198 mm	137 × 30 × 198 mm	137 × 30 × 198 mm
Weight	300 g	300 g	300 g

Front panels

CP-7005

SET button
MODE button

Ethernet interface
synchronization link SYN1

USB interface

serial interface
synchronization link SYN2

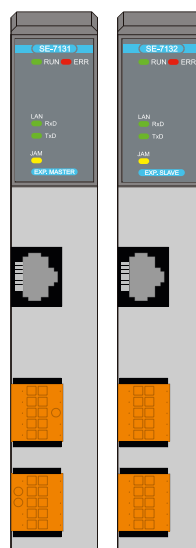
parallel interface RCP1
connection of redundancy control panel ID-20



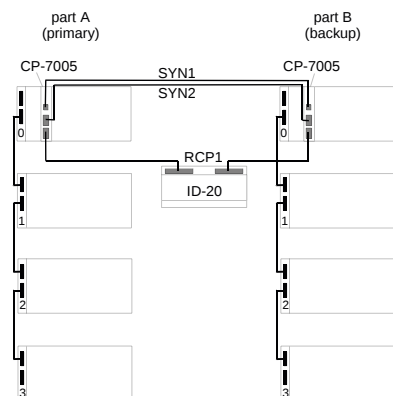
SE-7131, SE-7132

Ethernet interface
expanders connection RNT1

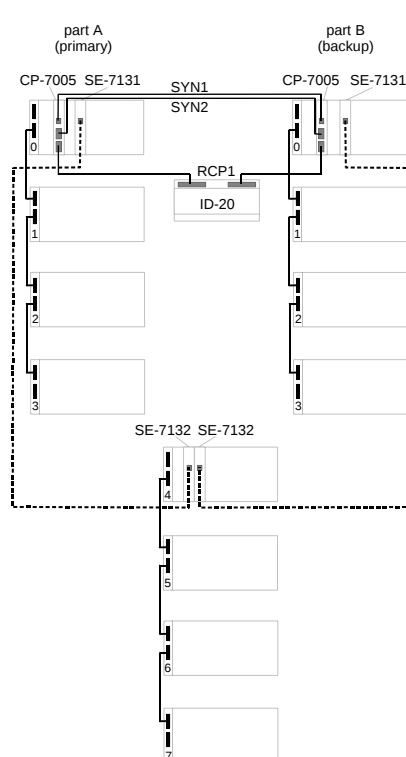
serial interface
for service purpose only



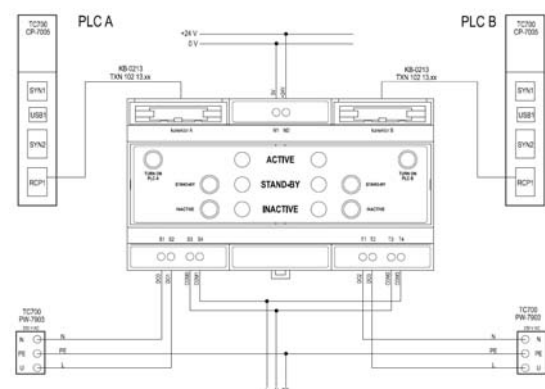
Interconnecting of two redundant CP-7005 and PW-7903 with ID-20

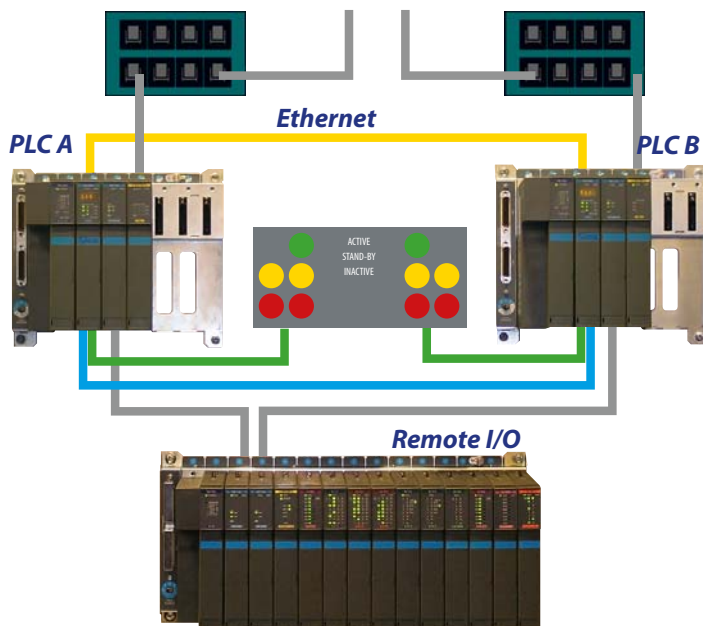


Enhanced redundant scheme of redundant I/O using system expanders



Basic scheme of redundant I/ O system





Programming – MOSAIC

Programming	According to IEC EN 61131-3; see MOSAIC
Graphical programming	Functional block diagram (FBD), Ladder diagram (LD)
Textual languages	Structured text (ST) Instruction list (IL)
On-line programming	Yes, any changes of program or data types
On-line debugging	Yes

SW tools, plug-ins available in MOSAIC

PLC simulator	Built-in
Alphanumeric display simulator	Panel Sim
Editor of alphanumeric display	PanelMaker
Editor of graphic display	Graphic PanelMaker (GPMaker)
Editor and simulator of feedback loop controller	PIDMaker
Monitoring and analysis of variables on time base	GraphMaker
Built-in visualization	Yes
User functional block and libraries creation	Yes
Libraries available	Motion control library, communication library, internet library, file system operation library, library for sending and receiving SMS, control and regulation library, building automation library etc.

Order numbers

TXN 170 05	CP-7005, CPU, with redundant function, Ethernet 10 Mbit RJ-45, 128 kB + 64 kB RAM, 2.5 MB DataBox (expandable up to 3MB), 2x SCH, 1x USB,
TXN 054 31	ID-20 operation panel for redundant CP-7005
TXN 171 31	SE-7131 System expander Master with ETH for redundant communication
TXN 171 32	SE-7132 System expander Slave with ETH for redundant communication