



Description of the S3 Standard IO Profile for Option S3 Compax3M

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1 General Description of the S3 Standard I/O Profile R0110001xx

This description is valid for R0110001xx as of version 06.

The R0110001xx.plcGRP I/O profile supports the SLS (Safely Limited Speed), SS1 (Safe Stop with safe motor torque off) and SS2 (Safe Stop with the motor torque being maintained) safety functions for Performance Level PL d.

With the 2-channel input SMF4 SS1 (Safe Stop with safe switch off of motor torque) should be triggered. Under certain conditions therefore performance level PL e, kat. 4 will be achieved.

Accordingly the installation manual

192_120212Nx_Description_of_the_S3_Standard_IO_Profile_for_Option_S3_Compax3M must be observed.

However, on both outputs DO_0.1 and DO_0.2, only PL c is achieved.

In the SafePLC Wizard, applications already created (*plcGRP) can be opened via “open file” and can be uploaded into the device via the connection dialog with “start connection with monitoring unit”. Depending on the application, different functions are assigned to the safe I/Os. Therefore, the applications are also called I/O profiles. The profile name depends on the I/O functions, the device type and on the feedback combination. The following paragraph will describe the meaning of the profile name R0110001xx.plcGRP

2 Profile Specifications

R0110001xx.plcGRP

The profile is suitable for rotary movements. The parameterization of the measured section is given in rotary units.

R0110001xx.plcGRP

The profile is to be used only for C3MxxxD6F11IxxT30Mxx or C3MxxxD6F11IxxT40Mxx devices.

R0110001xx.plcGRP

On connector X13, only the SRS50S SinCos feedback device can be used.

R0110001xx.plcGRP

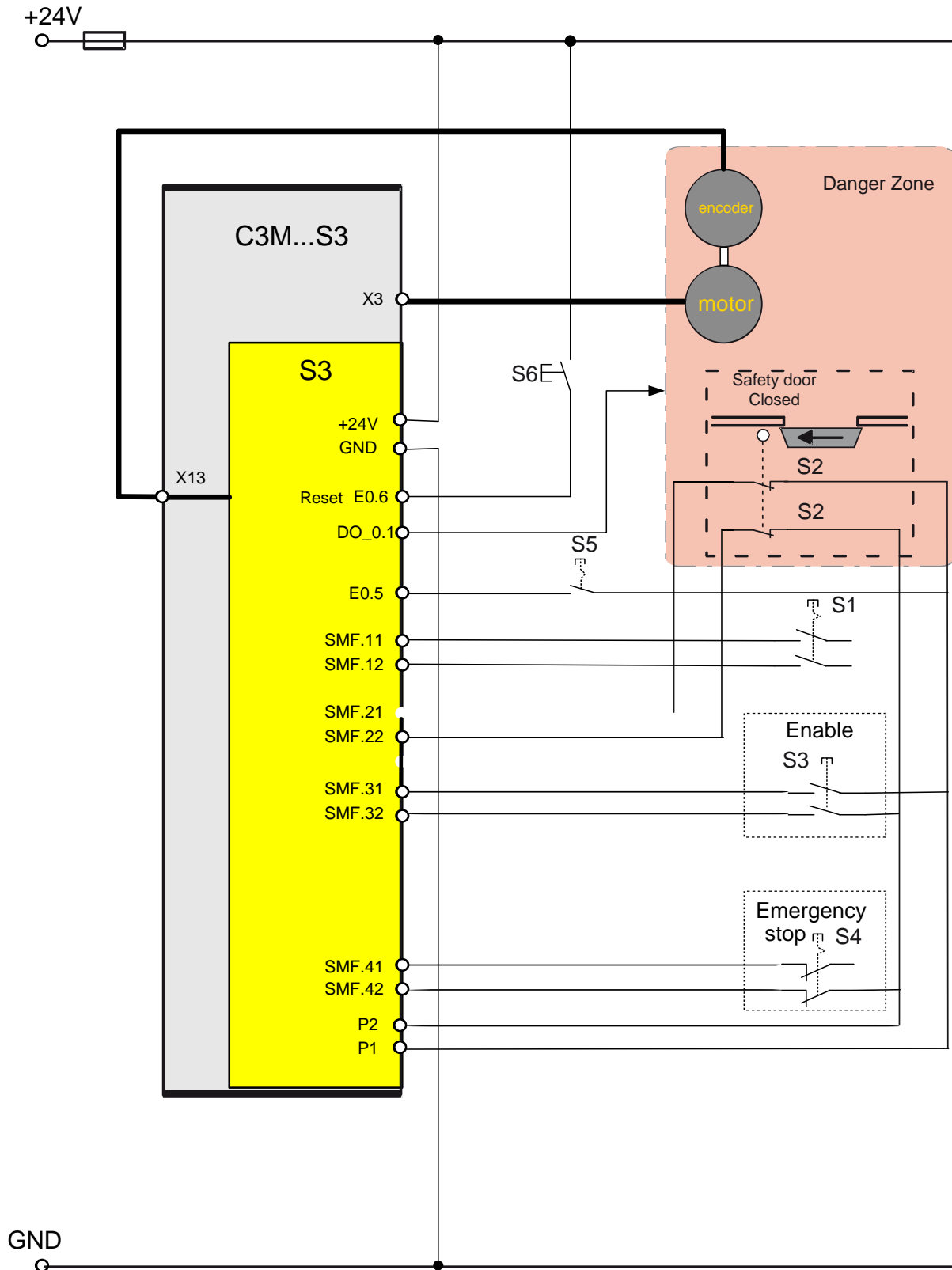
The profile does not allow an additional feedback device (redundant feedback system). For the safe motion function, thus only Performance Levels up to PL d are possible.

R0110001xx.plcGRP

This is the standard I/O profile. I.e. the Compax3M S03 devices are generally furnished with this I/O profile 01.

With xx the version number is defined.

3 Application Circuit Diagram



4 Functions of the Inputs and Outputs

X28 Pin	Designation	Function
1 & 2	SMF.11 & SMF.12	Grouped Input which can be used to define, whether SS1 or SS2 is triggered on SMF.2x when the safety door is opened. SMF.1x open: when the door is opened, SS1 is triggered. SMF.1x jumpered with P1/P2: when the door is opened, SS2 is triggered.
3 & 4	SMF.21 & SMF.22	Grouped input for safety door (wire-break proof) SMF.2x open: Set-up mode
5 & 6	SMF.31 & SMF.32	Grouped input for enabling pushbutton
7 & 8	SMF.41 & SMF.42	Grouped input for triggering an emergency stop SMF.4x open: SS1 is triggered SMF.4x jumpered with P1/P2: normal operation
9	E0.6	Reset Input
10	E0.5	Input safety door unlocking E0.5 open: no unlocking of the door E0.5 jumpered with P1: door unlocking active
11	DO_0.1	Output safety door unlocking DO_0.1=24V (OSSD): Safety door lock unlocked (Delay time programmable) DO_0.1=0V: Safety door lock locked
12	DO_0.2	Output Safe speed monitor (SSM) (only PL c) DO_0.2=24V (OSSD): Set-up mode SLS active (drive in motion)
13 & 14	SBC.1 & SBC.2	Only for internal STO diagnosis, no safe function stored in the I/O profile
15	P1	Pulse output 1 (OSSD)
16	P2	Pulse output 2 (OSSD)
17	+24 V	Supply voltage
18	GND	Supply voltage

5 Functional Description

Safety door application

Contacts S1, S2, S3 and S5 can be used in order to control the safety door application sequence.

Door lock control

If a door lock is used, the user can unlock the door lock before opening the safety door by closing S5. The door is unlocked via output DO_0.1=24V and the drive is brought to a standstill via SS2. It is possible to delay the switching of output DO_0.1 by a certain time in order to ensure that the drive is in safe operating stop, before the door lock is unlocked.

Otherwise, the drive will be put to a standstill via the S2 contacts upon opening of the safety door. Via the S1 contacts it is defined, if the drive is put to a standstill via SS1 or SS2 (see table above).

Enabling pushbutton

While the door is open, the drive can be only moved by closing the contacts S3 in the SLS (Safely Limited Speed) operating mode. The SLS operating mode is displayed via output DO_0.

In order to get back to normal operation, the safety door must be closed and locked and the drive must be restarted via pushbutton S6.

Notes:

- *As the standstill is not monitored after releasing the enabling pushbutton (no SOS), the enabling input is not suitable for jogging.*
- *The enabling pushbutton (SMF.3) is only useful in the "set-up mode" (SMF.1 = TRUE) **and** with open safety door (SMF.2 = FALSE). Therefore, pushing the enabling pushbutton with closed door will lead to an error state!*

General emergency stop function

Via switch S4, an emergency stop can be triggered at any time. In order to get back to normal mode, S4 must be reclosed and the drive must be restarted via pushbutton S6.

General monitoring of a maximum speed

Independent of the SLS operating mode, a general safe speed limit can be parameterized via the MSC monitoring block.

General monitoring of a motion direction

Via the parameterization of the SCA monitoring block, a defined motion direction can be safely blocked.

Braking delay:

The profile offers the possibility to delay the STO. This can be sensible when using mechanical brakes. Before the STO is triggered, it must be ensured that the mechanical brake has already been applied. For this, the time between the SS1 data message channel bit and the STO is adapted. With the default parameter setting, the delay is configured to 0. This corresponds to a delay of 8 ms.

Safety Instructions:

- The Parker motor holding brakes do not feature functional safety in accordance with EN ISO 13849 or EN 62061
- The contacts S3, S5 and S6 may not be automated.

The user must provide a suitable IEC program (T30 or T40) so that the commands requested in the SafePLC will be executed by the drive. With the R0110001xx.plcGRP standard I/O profile, 5 Bit of logic data are provided as inputs via the data message channel for the IEC program on object 814.13.

Object 814.13	Symbol	TRUE	FALSE	Data message channel
Bit 0	Inhibit Energize (SS1)	Enable	Inhibit	Bit ID 1
Bit 1	Reset Error (Start)	Reset	-	Bit ID 2
Bit 2	Stop for SS2	Enable	Inhibit	Bit ID 3
Bit 3	Input Enable (enable pushbutton)	Enable	Inhibit	Bit ID 4
Bit 4	Door open	Door open	Door close	Bit ID 5

If bit 0 is set to “false”, the IEC program must downramp the drive and finally switch to powerless (SS1). Therefore, the bit should be directly linked to the enable input of the MC_Power block.

Via bit 1 = “true”, the drive can be acknowledged. If the bit is to be used for starting the drive as described above, the bit should be directly linked to the enable input of the MC_Reset block, so that the drive can be acknowledged.

If bit 2 is set to “false”, the IEC program must downramp the drive and remain at standstill with torque (SS2).

If bit 3 is set to “true”, the drive is to move at creep speed (SLS).

The door status is indicated via bit 4.

Dagnostic auxiliary bits

Object 814.13	Symbol	TRUE	FALSE	Description
Bit 8	Emergency stop switch	Stop	Run	“Emergency Stop” pushed
Bit 9	Door Open (with Mode SS1)	Stop	Run	“Safety Door” open
Bit 10	SS2 failure	Error	Run	General failure in Service Mode Stop SS2
Bit 11	Max speed failure	Error	Run	General maximum speed exceeded
Bit 12	Door Open low speed failure	Error	Run	Set-up speed with open door is exceeded!
Bit 13	Safe direction failure	Error	Run	Only one direction is permitted - movement in the wrong direction has been executed!
Bit 14	SS2 SSX failure	Error	Run	Failure: SS2 during downramp or standstill

Note:

The data message channel in Compax3 Object O814.13 is directly available as IEC variable „C3Plus.SafetyMonitor_DiagnostisBits0_15“.

Additional iec variables: C3Plus.SafetyMonitor_AlarmCode (O814.11)
 C3Plus.SafetyMonitor_ErrorCode (O814.12)