

ControlMaster CM50

Universal process controller, ½ DIN



Using a CM50 controller as a back up to Freelance PLC/DCS

Measurement made easy

CM50 and
Freelance PLC/DCS

Introduction

Recording and Control products can now be found via both the Measurement Products sales channels and the Control Systems essential automation product suite. This provides a whole new world of products that Recorders and Controllers can interact with.

For example, a plant using a plant-wide distributed control system (DCS) might have a requirement for a back up system in the event that something happens to the main control system.

This document details how to configure a ControlMaster CM50 and a Freelance AC700F controller to enable the CM50 to take over and maintain control of a process in the event the AC700F fails.

Communication method

The ControlMaster range of universal controllers can connect and communicate with a Modbus system using either an Ethernet (Modbus TCP) or serial (Modbus RS485) connection. In this example, Modbus RS485 is used to communicate with the AC700F.

Overview

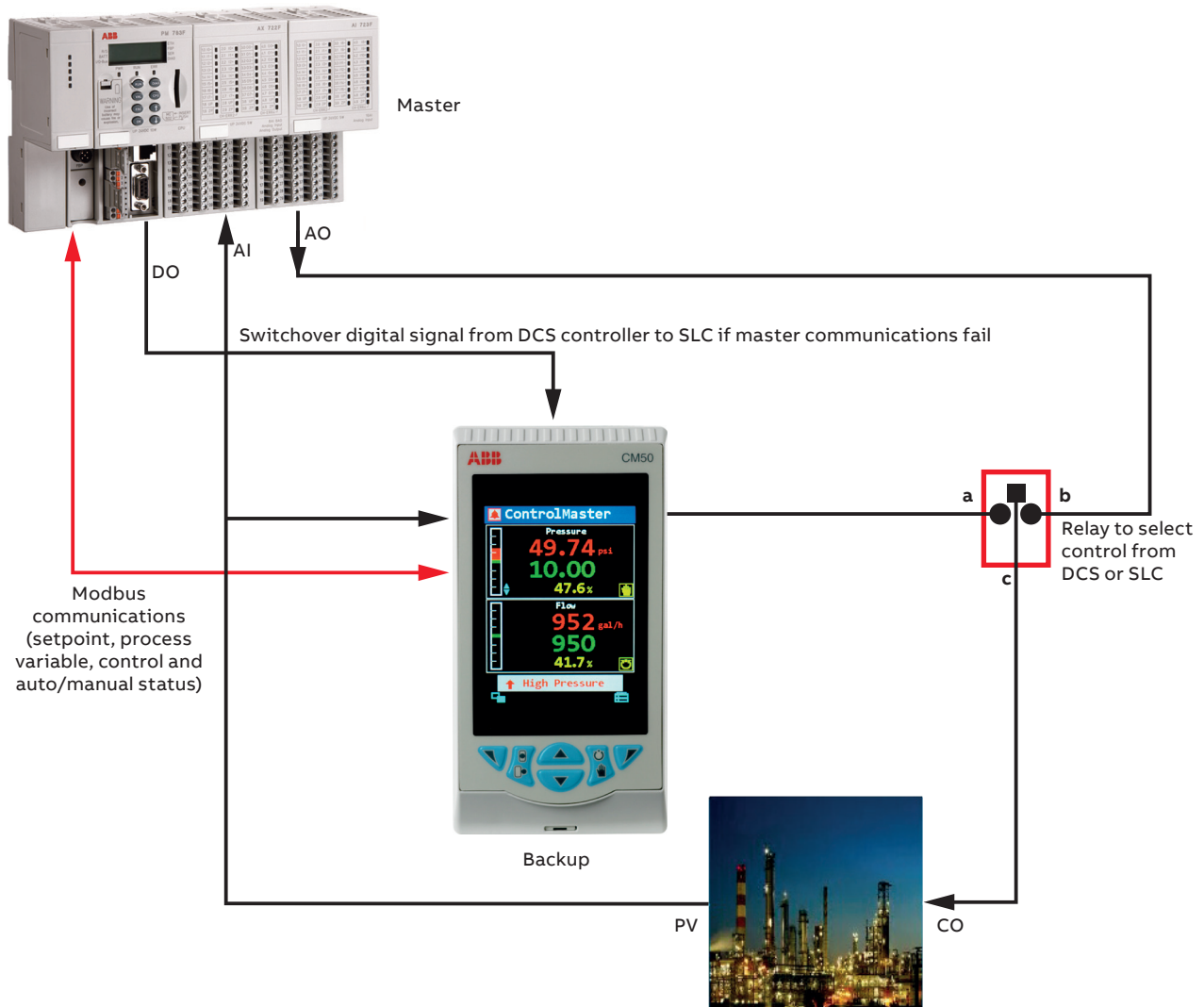


Figure 1 Application overview

Key features

- A cost-effective solution using a well integrated engineering tool and operator interface (Control Builder F and DigiVis, respectively).
- With little engineering effort and no additional wiring, the setpoint and auto/manual status can be synchronized using Modbus RS485 communications (only *.prt and *.hwm files are imported).
- Transfer of control from the DCS to the CM50 is initiated by either a Modbus* Communication Failure or a DCS loop error.
- It is possible to enable and disable local setpoint changes on the CM50 using the DCS control panel:
 - Enabled – setpoint cannot be changed locally
 - Disabled – local setpoint adjustment can be performed
- It is possible to change the control status of the CM50 (acting as Master or Backup) from the DCS control panel using Modbus Communications.
 - M = manual (Backup)
 - A = auto (Master)
- All information shown on the CM50's display can be viewed on the DCS control panel (for example, process variable and setpoint).
- In the event of the CM50 assuming control, the auto/manual and setpoint switch-over is performed to provide a bumpless transfer.
- The CM50's customizable display can show up to 6 variables, enabling display of 2 separate loops.

*Modbus is a registered trademark of of the Modbus-IDA organization.

Hardware setup, connections and configuration

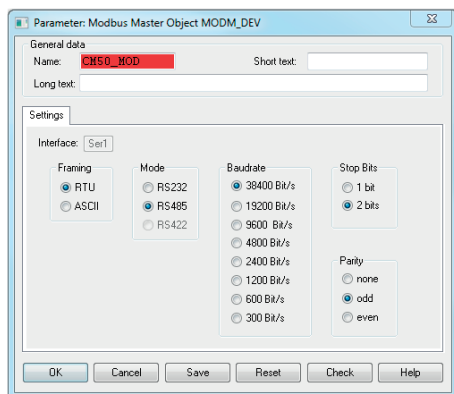
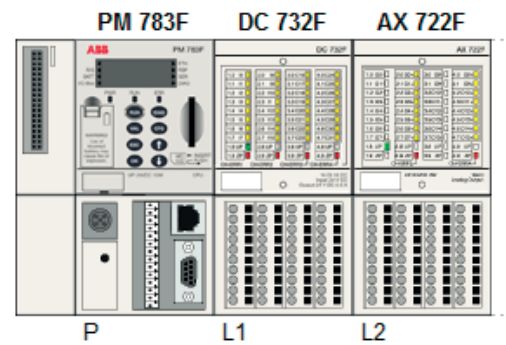
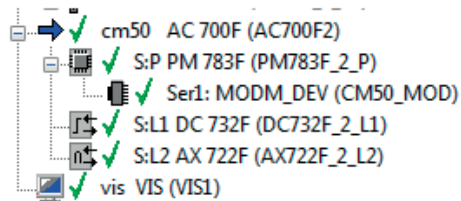


Figure 2 MODM_DEV (CM50_MOD) configuration details

To configure the AC700F, the function blocks shown in Figure 3 are programmed.

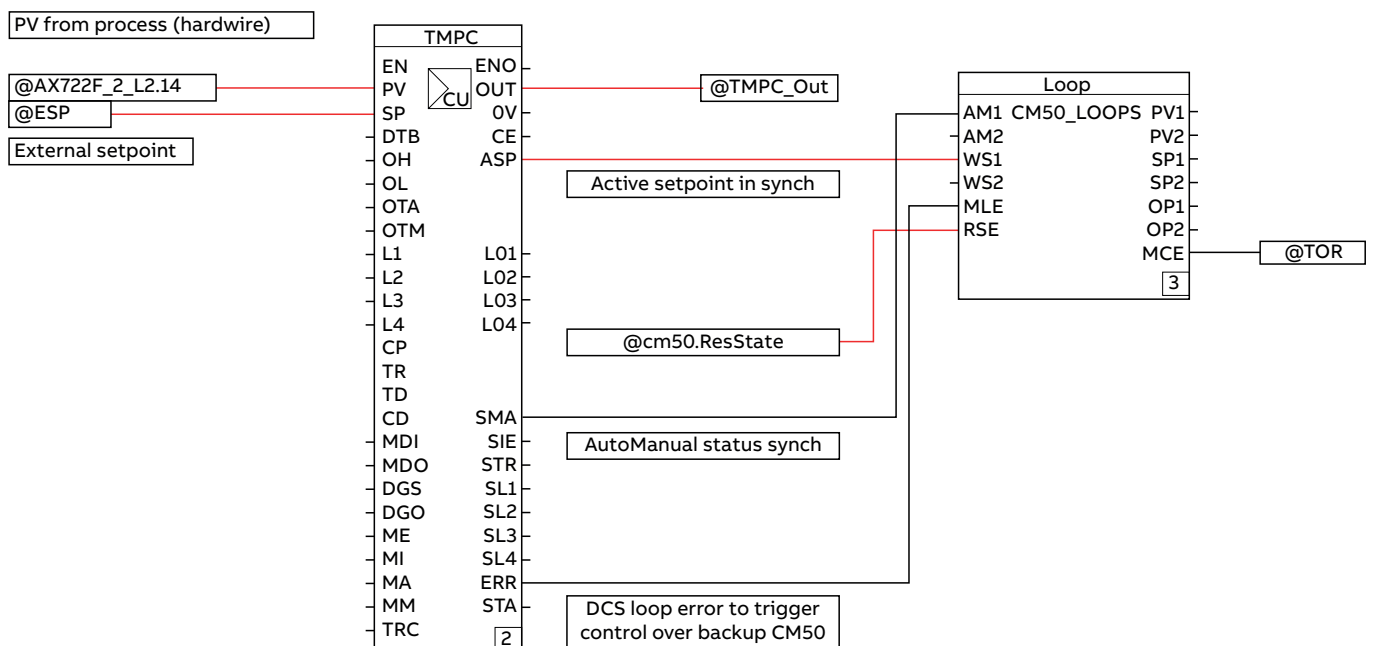


Figure 3 AC700F function blocks

...Hardware setup, connections and configuration

Figure 4 shows the CM50 connected to the AC783F demo box.

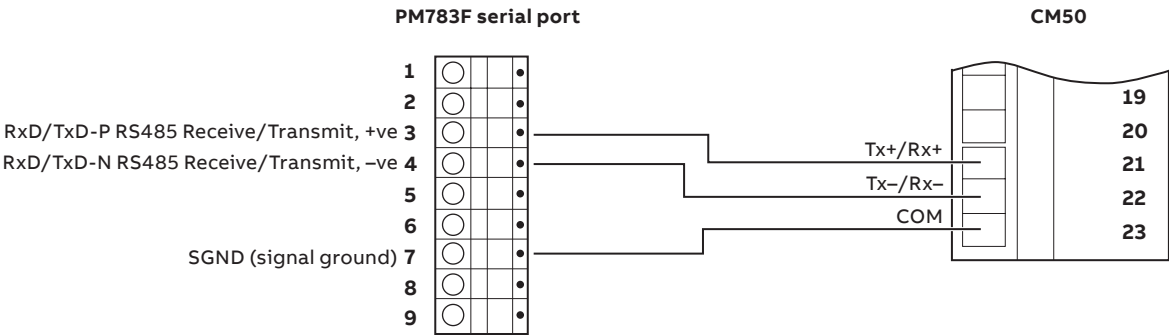


Figure 4 AC783F/CM50 Modbus connections

Figure 5 shows the connections between the demo box AC700F (DC-RB-AC 700F-V9) and CM50, as well as an example process.

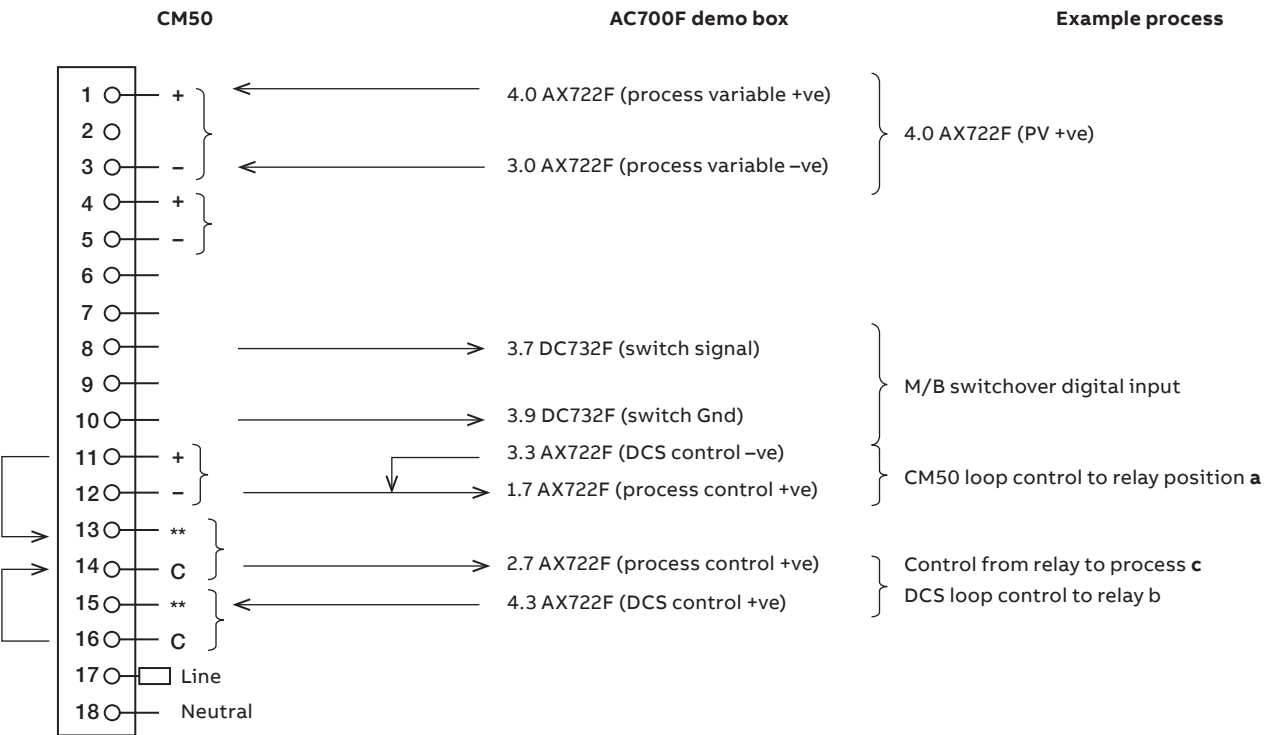


Figure 5 CM50/AC700F demo box (DC-RB-AC 700F-V9) example process connections

- Note.**
- References to **a**, **b** and **c** in Figure 5 refer to the relay poles in the application overview diagram – see Figure 1 on page 2.
 - To use the AC700F demo box to generate the PV to the CM50, see example process connections in Figure 5.
 - The application requirement is for single pole, dual throw (SPDT) relays; but the CM50 is equipped with single pole, single throw (SPST) relays.
 - To create an SPDT relay, the CM50’s terminals 14 and 16 are linked. This represents relay pole **c** in the application overview diagram (Figure 1 on page 2) where the control output is directed to the process.
 - The CM50’s terminals 11 and 13 are also linked; this is represented by relay pole **a** on the application overview diagram (Figure 1 on page 2).

The CM50 function block configuration is as follows:

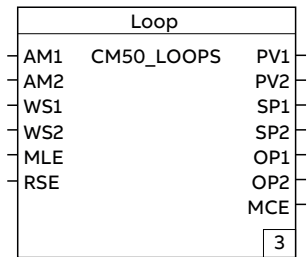


Figure 6 CM50_LOOPS UFB details

Name	Data type	Conf.	Acc.	Comment
Inputs				
AM1	Boolean	No	RW	Input from SMA pin of continuous controller output for loop 1 – write loop 1 AM mode
AM2	Boolean	No	RW	Input from SMA pin of continuous controller output for loop 2 – write loop 2 AM mode
WS1	Real	No	RW	Input from ASP pin of continuous controller output for loop 1 – write loop 1 SP
WS2	Real	No	RW	Input from ASP pin of continuous controller output for loop 2 – write loop 2 SP
MLE	Boolean	No	RW	Input from Err pin of continuous controller output for loop 1 – master loop error
RSE	Boolean	No	RW	Resource state error – system variable
Outputs				
PV1	Real	No	RO	CM50 loop 1 PV value
PV2	Real	No	RO	CM50 loop 2 PV value
SP1	Real	No	RO	CM50 loop 1 active setpoint
SP2	Real	No	RO	CM50 loop 2 active setpoint
OP1	Real	No	RO	CM50 loop 1 control output
OP2	Real	No	RO	CM50 loop 2 control output
Parameter definition mask				
Slave_Add1 to 7	Byte	Yes	RW	CM50 Modbus slave address

Table 1 Pin details

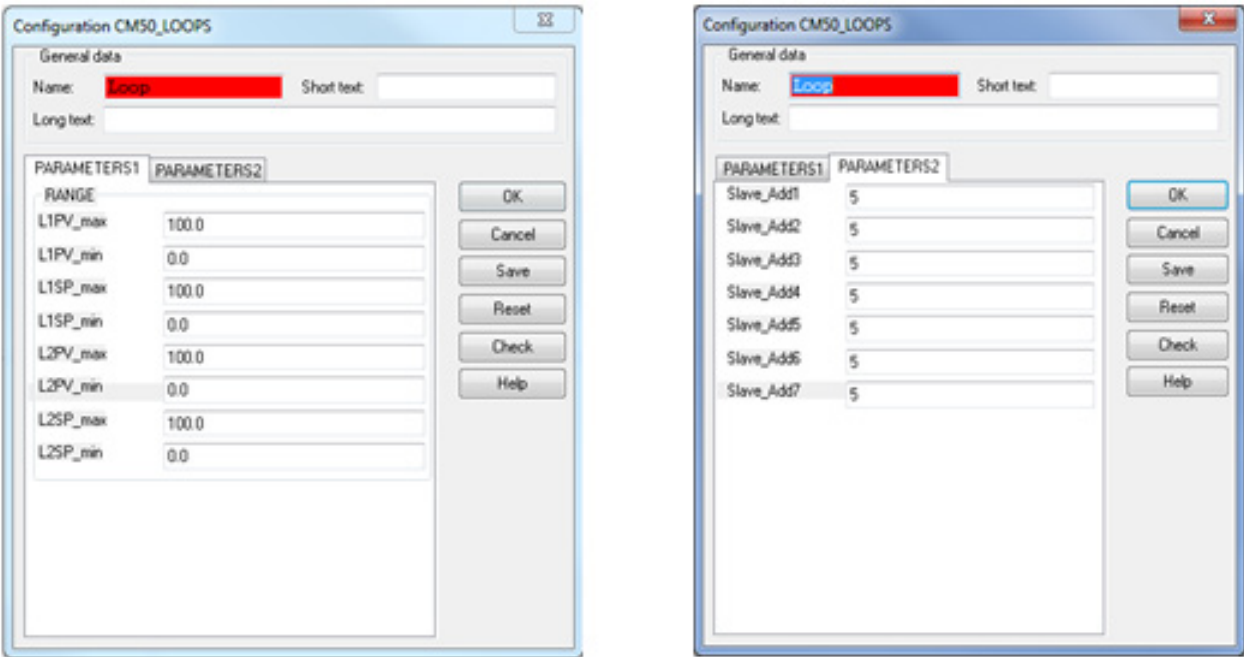


Figure 7 Parameter mask

...Hardware setup, connections and configuration

Operation is applicable to both loops.

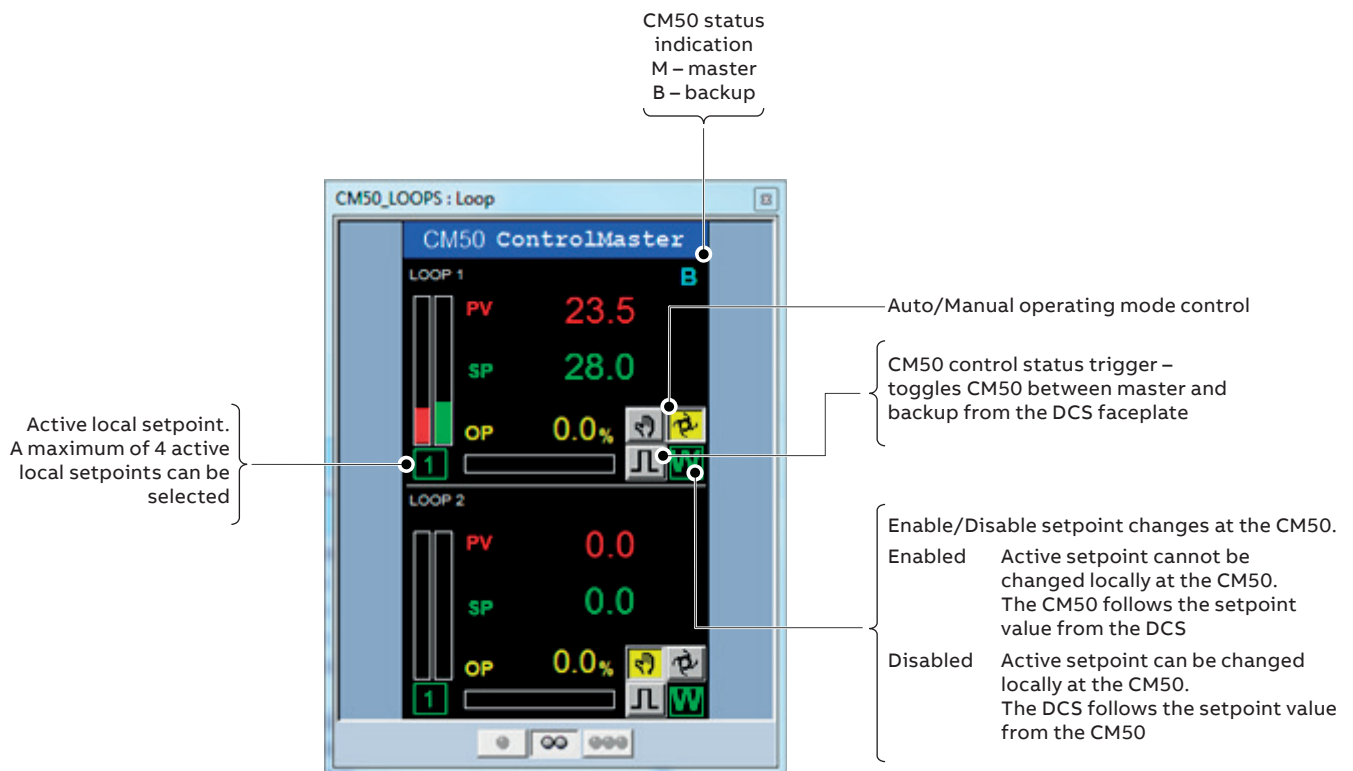


Figure 8 CM50 ControlMaster display simulation on DCS control panel

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