MNS *i*S Motor Control Center
Interface Manual PROFINET IO
System Release V7.6

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This document relates to the MNS *i*S System Release 7.6.

Table of content

General

Target Group

This document describes communication and control interfaces used in MNS *i*S. The manual is primarily intended for those requiring information on accessing information and data provided from MNS *i*S. Furthermore the document provides information for integration of MNS *i*S as Fieldbus component into PLC or higher level Process Control Systems to control system and application engineers.

It is assumed that the reader of this manual is familiar with basic terms of Fieldbus and control communication (e.g. basic knowledge about PROFIBUS, Modbus etc.).

Use of Warning, Caution, Information and Tip icon

This publication includes **Warning**, **Caution**, and **Information** icons where appropriate to point out safety related or other important information. It also includes **Tip** icons to point out useful hints to the reader. The corresponding symbols should be interpreted as follows:

The electrical warning icon indicates the presence of a hazard that could result in *electrical shock.*

The warning icon indicates the presence of a hazard that could result in *personal injury.*

The caution icon indicates important information or warnings related to the concept discussed in the text. It might indicate the presence of a hazard that could result in *corruption of software or damage to equipment/property.*

The information icon alerts the reader to pertinent facts and conditions.

The tip icon indicates advice on, for example, how to design your project or how to use a certain function

Although **Warning** notices are related to personal injury, and **Caution** notices are associated with equipment or property damage, it should be understood that the operation of damaged equipment could, under certain operational conditions, result in impaired process performance leading to personal injury or death. It is, therefore, imperative that you comply fully with all **Warning** and **Caution** notices.

Terminology

Abbreviation	Term	Description
	Alarm	Alarm is defined as status transition from any state to abnormal state. Status transition to abnormal state can be data crossing over the pre-defined alarm limit.
AR	Application Relation	Cooperative association between two or more application-entity-invocations for the purpose of exchange of information and coordination of their joint operation.
	Bus Local	A Control Access term describing that the M*Control* accepts it's commands from a device on the switchgear controller network level, e.g. the Web Interface, M*View*.
DCP	Dynamic Configuration Protocol	Assignment of IP addresses and device names via Ethernet.
DCS	Distributed Control System	See also PCS.
Eth	Ethernet	Ethernet is a Local Area Network (LAN) technology. The Ethernet standard specifies the physical medium, access control rules and message frames.
	Event	An event is a status transition from one state to another. It can be defined as an alarm, if the state is defined as abnormal or as warning as a pre-alarm state.
GSDML	General Station Description Markup Language	Device description files for PROFINET.
	Hardware Local	A Control Access term describing that the M*Control* accepts it's commands from the hardwired inputs, when the respective local control input is set to true.
LVS	Low Voltage Switchgear	A factory built assembly built to conform with IEC 60439-1
MCC	Motor Control Center	Common term used for switchgear used for motor control and protection.
MNS		Modular Low Voltage Switchgear family from ABB
MNS *i*S		The integrated intelligent switchgear solution from ABB
	M*Start* M*Feed* M*Control* M*Link* M*View* M*Navigate*	MNS *i*S components integrated in the switchgear, see the MNS *i*S System Guide for technical details.
	Motor Starter	Consists of motor controller and electrical components to control and protect a motor,

Abbreviation	Term	Description
		part of Motor Control Center.
PCS	Process Control System	High level process control system
PLC	Programmable Logic Controller	Low level control unit
	PROFINET	PROFINET is an open standard for Industrial Ethernet and standardized in IEC 61158 and IEC 61784.
PNIO	PROFINET IO	PROFINET for decentralized periphery and distributed automation
RCU	Remote Control Unit	Local control unit with pushbuttons and indicator to operate a device (e.g. motor) from field level.
	Software Local	A Control Access term describing that the M*Control* accepts it's commands from the hardwired inputs as a result of either the PCS or M*View* passing the Control Access Authority to Soft Local. Note: Does not require the hardwired local inputs to be set to true.
	Trip	A consequence of an alarm activated or an external trip command from another device to stop the motor or trip the circuit breaker.
	Warning	A warning is defined as a status transition from any state to pre-alarm state to inform in advance that an alarm level is reached.

Related Documents

MNS iS

1TGC910211 M0203 MNS *i*S Interface Manual M*Link*, Release 7.0

1TGC910111 M0201 MNS *i*S M*Link* Upgrade Kit Manual

1TGC910223 M0201 MNS *i*S Interface Manual Web Interface, Release 7.6

1TGC910231 M0203 MNS *i*S Interface Manual OPC Server, Release 7.3

1TGC910241 M0201 MNS *i*S Interface Manual Profibus, Release 7.0

1TGC910251 M0202 MNS *i*S Interface Manual Modbus, Release 7.0

1TGC910283 M0201 MNS *i*S M*Control* Interface Manual Profibus Direct, Release 7.6

1TGC910261 M0201 MNS *i*S Interface Manual Redundancy, Release 7.0

1TGC910271 M0202 MNS iS M*Connect* Interface Manual, Release 7.0

1TGC910001 B0204 MNS *i*S System Guide

1TGC910201 M0201 MNS *i*S Quick Guide Installation and System Setup, Release 7.0

1TGC910090 M0208 MNavigate Help file V7.5

1TGC910018 M0208 MNS *i*S ATEX – Enhancements for Safety

PROFINET

[1] Application Layer protocol for decentralized periphery and distributed automation, Specification for PROFINET, Version 2.1, June 2006, Document id TC2-06-0007

[2] Application Layer services for decentralized periphery and distributed automation, Specification for PROFINET, Version 2.1, June 2006, Document id TC2-06-0006

[3] GSDML Specification for PROFINET IO, Version 2.10, August 2006, Document id TC4-06-0004a

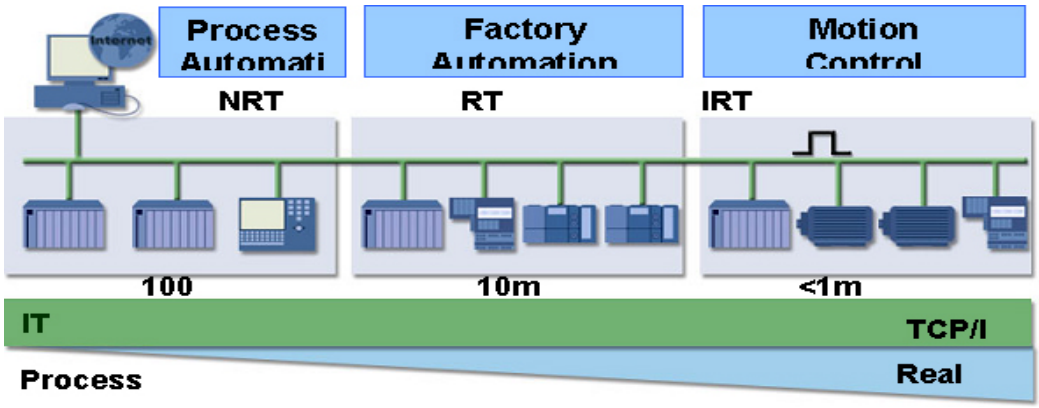
[4] Installation Guideline PROFINET, Part 2: Network Components, Version 1.01, February 2004, Order no: 2.252 p2

[5] ABB SOE Profile for Profinet

Revision History

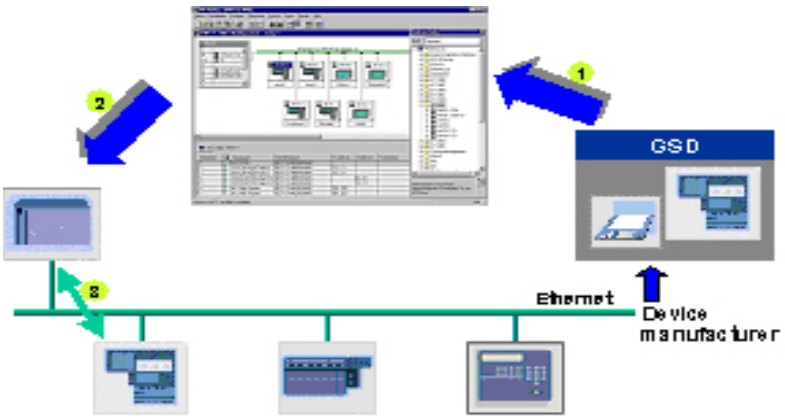
Technology Overview

PROFINET is an open standard for Industrial Ethernet and standardized in IEC 61158 and IEC 61784. For non-real-time processes, PROFINET uses Non Real Time (NRT) communication which follows the international standard IEEE 802.3. Where NRT is not sufficient, Real Time (RT) communication can be used or Isochronous Real Time (IRT) for clock rates less than 1ms and jitter less than 1 µs.



PROFINET IO describes a device model, consisting of slots and groups of I/O channels (subslots). The characteristics of the field devices are describes by the GSD (General Station Description) on an XML basis (a GSDML file).

The engineering of PROFINET is done in a familiar way with PROFIBUS. The field devices are assigned to one or more control systems during configuration. During engineering the IO-Device is to be configured according to the actual hardware configuration based on the content in the GSDML file. The IO-Device is simultaneously integrated, parameterized and configured into the PROFINET topology (1). After completion of the engineering process, the installer loads the data for the expansion into the IO-Controller (2). The IO-Controller independently takes over data exchange with the IO-Device (3).



Interfaces

MLink connectors and LED indication

M*Link* provides the facility to connect MNS *i*S on a single entry point to a process control system via PROFINET. M*Link* acts as a PROFINET IO Device.

For details of MLink interfaces and LED indication, please see the corresponding MLink Interface Manual:

Hardware ID numbers	**1TGE1020x9Rxxxx**	**1TGE120021R0010**
MLink Types		
Hardware available for MNS iS Versions	up to V6.0	from V6.1 onwards
MNS iS Interface Manual **MLink**	1TGC 91012x M020x	1TGC 910210 M020x

MNS iS Software requirements

For full support of MNS iS V7.0 functionality the PROFINET IO interface requires

- MLink Image 1TGE131013R0001 or higher
- MLink Application 1TGE131133R0001 or higher
- MNavigate Version 7.0 or higher

Network configuration

Topology

Star or ring topologies are possible with MNS *i*S. Ring topology can be used to increase the availability in the network (note that switches supporting ring topology must be used).

Switches

A switch must be used for PROFINET to avoid problems with the collision domain restrictions of Ethernet networks and must support:

- Support of Ethernet according to ISO/IEC 8802-3 (10/100 Mbit/s)
- Support of switching according to ISO/IEC 15802-3 and IEEE 802.1Q (Quality of Service)
- Full duplex operation
- Support of the Auto Cross-Over function for Twisted Pair Media

PROFINET switches shall support priority-tagged frames according to IEEE 802.1Q and at least 2 priority queues according to IEEE 802.1D and Q. For better real-time behavior it is recommended that it supports up to 4 priority queues.

Network cables

Category 5 shielded twisted pair cables with shielded RJ45 connectors must be used.

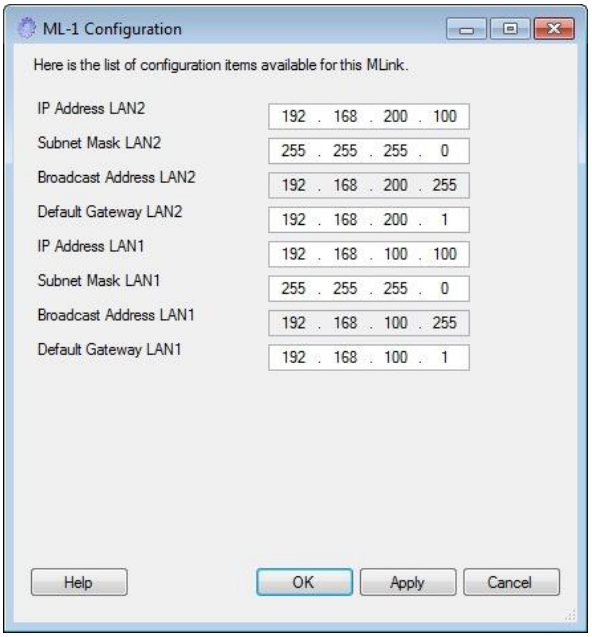
Getting Started

M*Link* requires following configuration parameters in order to startup and communicate correctly on PROFINET.

Parameter	Default Value	Remarks
IP Address LAN1	192.168.100.100	IP address can be temporary changed via DCP
Subnet LAN1	255.255.255.0	Subnet can be temporary changed via DCP
Gateway LAN1	192.168.100.1	Gateway can be temporary changed via DCP
Station Name	Name of the M*Link*	Station Name can be temporary changed via DCP

PROFINET uses the LAN1 interface of the M*Link*.

The IP address is set in MNavigate: M*Link* > *Configure* > *IP Configuration*.



DCP services in control system can be used to discover actual IP addresses and station names.

Station Name

All PROFINET devices are uniquely identified with Station Names. The M*Link* is the PROFINET device in MNS *i*S and the name of the M*Link* is used as Station Name.

The name may only consist of following characters:

- **Letters:** a to z (only small letters)
- **Numbers:** 0 to 9
- **Other characters:** -

Restrictions:

The maximum length of the Station Name is 63 characters. The name must start with a letter and must not end with a dash (-).

All letters are lower case. If the M*Link* name contains upper case letters these will be automatically transformed to lower case by the PROFINET IO interface.

For more detailed information about encoding of the Station Name see [1].

GSDML file

This document describes GSDML-V2.1-ABB-MNSiS-20120202.xml.

There are two languages defined in the GSDML file. The first is the primary language which is according to the standard [3] English. The other language is called “mnsis” and is an internal language used only in the MLink (this part may be removed from the GSDML file if necessary when importing in DCS engineering tool).

Byte Order

The byte order of the data sent on the PROFINET network is big-endian (a.k.a. network byte order or Motorola format).

In this document the Least Significant Byte (LSB) is indicated by the lower indexed byte (e.g. byte 0) the higher indexed byte is the Most Significant Byte (MSB), e.g. in a data word of data type Unsigned32 byte 0 is the LSB and byte 3 is the MSB.

Multi Controller

The PROFINET IO interface in the M*Link* supports multiple connections from control systems. This is also known as *Shared Devices* in PROFINET.

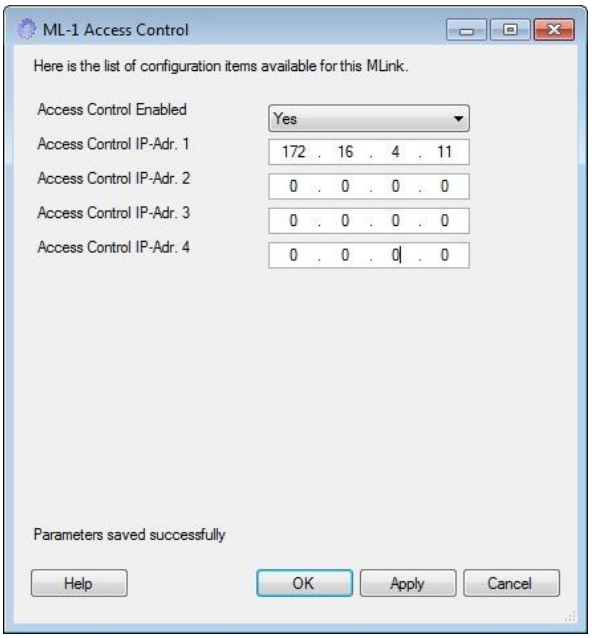
Each connection in PROFINET IO is called an Application Relation (AR). M*Link* supports up to 4 ARs to be connected simultaneous. The ARs may control different M*Control*s of the same M*Link*.

To connect more then one IO Controller to the same M*Control* is not supported (i.e. a M*Control* may only be controlled by one IO Controller).

Access Control

An access control function can be enabled with M*Navigate* to define IP addresses of PROFINET IO Controllers that is allowed to connect to the M*Link*. In the access control function up to four IP addresses may be defined.

If access control is enabled, only PROFINET IO Controllers with an IP address that is defined in the access control function can establish communication with the M*Link*. All attempts from PROFINET IO Controllers not having an IP address among the approved will be rejected.



In above configuration only a PROFINET IO Controller with an IP address of 172.16.4.11 is able to establish communication with the M*Link*.

Sequence of Events (SOE)

The Sequence of Events (SOE) functionality follows the ABB SOE Profile for Profinet specification [5]. Events that occur (events, alarms and trips in MNS *i*S) are sent to the PROFINET IO Controller as process alarms. Each of these has a unique identifier called AlarmId, specified by the ABB SOE Profile for Profinet specification [5].

The source of a process alarm needs to have a slot address and a subslot address. The slot address will be the slot number of the starter/M*Control* that the event originates. The subslot address will always be 1. In order for an IO Controller to receive a process alarm from a MNS *i*S M*Link* the IO Controller needs to have the starter/M*Control* configured and a submodule on subslot 1 of that starter/M*Control*.

When an event is sent to an IO Controller an acknowledgement is sent back to the IO Device (in this case MNS *i*S M*Link*), this is normal functionality in PROFINET. If no acknowledgement is received within a certain amount of time (ca 4 seconds) the event is retransmitted.

If no acknowledgement has been received for an event after 10 retransmissions the event is dropped.

All process alarm packets contain a header, with PROFINET related information, and alarm data. The alarm data is manufacturer specific. Here it is specified by the ABB SOE Profile for Profinet. The packet contains a `UserStrucutreIdentifier` (`USI`) in order to be used to identify the contents of the alarm data. The `USI` is always 0x1000 which means the data is according to the ABB SOE Profile for Profinet.

The table below shows what data and how it is arranged and used in MNS *i*S.

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	Major version number of the Profile. Always 0x1. (Unsigned16)							
2-3	Minor version number of the Profile. Always 0x0. (Unsigned16)							
4-7	External timestamp. Seconds passed since 1970-01-01-00:00:00. (Unsigned32)							
8-11	External timestamp. Nanoseconds passed during the current second. (Unsigned32)							
12-15	Leap second pending. Always 0. For future use. (Integer32)							
16-19	Leap second occurred. Always 0. For future use. (Integer32)							
20-23	Time quality class according to IEC 61850-5. Always 0x3. (Unsigned32)							
24-25	Channel number. Always 0x8000. (Unsigned16)							
26-27	AlarmId. (Unsigned16)							
28-67	Description of the event. (OctetString[40])							
68	Monitored value. (Unsigned8)							
69-72	Severity. Event = 1, Alarm = 3, Trip = 5. (Integer32)							

There are three types of events in MNS *i*S. These are

- Events. Informational only.
- Alarms. Warning – non fatal.
- Trips. When motor trips – fatal.

When MNS *i*S events occur it will be sent to the IO Controller and the “monitored value” from the table above will always be 1 for these.

For MNS *i*S alarms and trips the behavior is a little different. When an alarm or trip appears it will be sent to the IO Controller with “monitored value” set to 1 just as for events. When the alarm or trip disappears (that is when it is no longer active) it will also be sent to the IO Controller but this time with “monitored value” set to 0 to indicate that the alarm or trip is cleared.

Alarm-ID

Below a table of all possible events (which events that are actually checked for and sent to IO Controller depends on what protection and supervision functions that has been enabled in ME).

Description	Alarm	Trip	Event
Stall Protection	1001	2001	
Earth Leakage	1002	2002	
Contact Temperature Unbalance	1003	2003	
External Trip 1	1004	2004	
External Trip 2	1005	1005	
Thermal Overload (TOL)	1006	2006	
PTC Supervision	1007	2007	
PTC Supervision Short Circuit		2008	
PTC Supervision Open Circuit		2009	
Underload	1010	2010	
Underload CosPhi	1011	2011	
Phase Failure	1012	2012	
Phase Unbalance	1013	2013	
Under Voltage	1014	2014	
Control Voltage	1015	2015	
Start Limitation	1016	2016	
Auto Restart Inhibit	1017		
Emergency Stop		2018	
Main Switch Supervision	1019	2019	
Feedback Supervision K1	1020	2020	
Feedback Supervision K2	1021	2021	
Feedback Supervision K3	1022	2022	
Motor Still Running		2023	
Unexpected Feeder Current		2024	
Motor Not Running		2025	
Welded		2026	
Test Mode Failure		2027	

Description	Alarm	Trip	Event
No Load	1028	2028	
IRF Hardware		2029	
Both Limit Switches Active		2030	
Actuator Torque Open		2031	
Actuator Torque Close		2032	
PT100-1Ch Card Failure	1033	2033	
PT100-1Ch Sensor Low Limit	1034	2034	
PT100-1Ch Sensor Short Circuit		2035	
PT100-1Ch Sensor High Limit	1036	2036	
PT100-1Ch Sensor Open Circuit		2037	
PT100-3Ch Card Failure	1038	2038	
PT100-3Ch Sensor1 Low Limit	1039	2039	
PT100-3Ch Sensor1 Short Circuit		2040	
PT100-3Ch Sensor1 High Limit	1041	2041	
PT100-3Ch Sensor1 Open Circuit		2042	
PT100-3Ch Sensor2 Low Limit	1043	2043	
PT100-3Ch Sensor2 Short Circuit		2044	
PT100-3Ch Sensor2 High Limit	1045	2045	
PT100-3Ch Sensor2 Open Circuit		2046	
PT100-3Ch Sensor3 Low Limit	1047	2047	
PT100-3Ch Sensor3 Short Circuit		2048	
PT100-3Ch Sensor3 High Limit	1049	2049	
PT100-3Ch Sensor3 Open Circuit		2050	
Fuse Supervision L1		2051	
Fuse Supervision L2		2052	
Fuse Supervision L3		2053	
Contact Temp. Supervision L1	1054	2054	
Contact Temp. Supervision L2	1055	2055	
Contact Temp. Supervision L3	1056	2056	
Contact Temp. Supervision 2 L1	1057	2057	
Contact Temp. Supervision 2 L2	1058	2058	
Contact Temp. Supervision 2 L3	1059	2059	
Switch Cycle Supervision K1	1060		
Switch Cycle Supervision K2	1061		
Switch Cycle Supervision K3	1062		
Operating Hours Supervision	1063		

Description	Alarm	Trip	Event
MStart Insertion Cycle	1064		
StarDelta Transition Failed		2065	
MStart Id Number Or Range Error		2066	
MStart Communication Error	1067	2067	
Location Supervision		2068	
IRF Software	1069	2069	
Active Power Supervision Low	1070	2070	
Active Power Supervision High	1071	2071	
MStart Range Error		2072	
Feeder MCB		2073	
Minimum Protection Mode	1074	2074	
Unprotected Mode 1	1075	2075	
Unprotected Mode 2	1076	2076	
Ext-IO Analog 2AI Card Failure	1077	2077	
Ext-IO AC-4DI-2DO Card Failure	1078	2078	
Ext-IO AC-7DI Card Failure	1079	2079	
Ext-IO Analog 1Ai1Ao Card Failure	1080	2080	
MControl/MConnect IO Card Failure	1081	2081	
Ext-IO DC-4DI-2DO Card Failure	1082	2082	
Fuse Firmware Configuration	1083	2083	
PTC Card Failure	1084	2084	
Motor Stopped			3070
Motor Stopped By RCU			3071
Motor Stopped By Priority Stop			3072
Motor Started			3073
Motor Started By RCU			3074
Motor Started CW			3075
Motor Started CW By RCU			3076
Motor Started CCW			3077
Motor Started CCW By RCU			3078
Motor Started Open Direction			3079
Motor Started Close Direction			3080
Motor Started N1			3081
Motor Started N2			3082
Motor Tripped			3083
Failsafe Activated			3084

Description	Alarm	Trip	Event
Main Switch Off			3085
Test Position Activated			3086
Main Switch On			3087
Test Position Deactivated			3088
Configuration Parameter Changed			3089
Parameter Changed			3090
CA Switched To Local			3091
CA Switched To Bus-Local			3092
CA Switched To Remote			3093
TOL Bypass Activated			3094
TOL Reset Level Reached			3095
Time Synchronization Lost			3096
Time Synchronization OK			3097
HW Booting			3098
HW Initializing			3099
HW Online			3100
HW Error or Missing			3101
HW Offline			3102
Switched to Primary			3103
Switched to Backup			3104
CA Switched to MControl Fieldbus Interface			3105
MControl Started			3106
Minimum Protection Mode Started			3107
Minimum Protection Mode Stopped			3108
Motor Stopping			3109
Proof Test Started			3110
Proof Test Stopped			3111
GPI1 Cleared			3112
GPI1 Set			3113
GPI2 Cleared			3114
GPI2 Set			3115
GPI3 Cleared			3116
GPI3 Set			3117
GPI4 Cleared			3118
GPI4 Set			3119
GPI5 Cleared			3120

Description	Alarm	Trip	Event
GPI5 Set			3121
Redundancy Error	1105		

The table above describes the possible events. The type of event (alarm, trip or event) is indicated by the columns to the right and also the AlarmId. If no AlarmId is indicated then it is not applicable. E.g. “Main Switch Supervision” may generate an alarm or a trip depending on the circumstances. The alarm and trip have separate AlarmIds.

The description that is sent in the process alarm packet to the IO controller will contain the description as above with a prefix depending on type of event. The prefix is

- “ALARM: “ when alarm.
- “TRIP: “ when trip.
- “EVENT: “ when event.

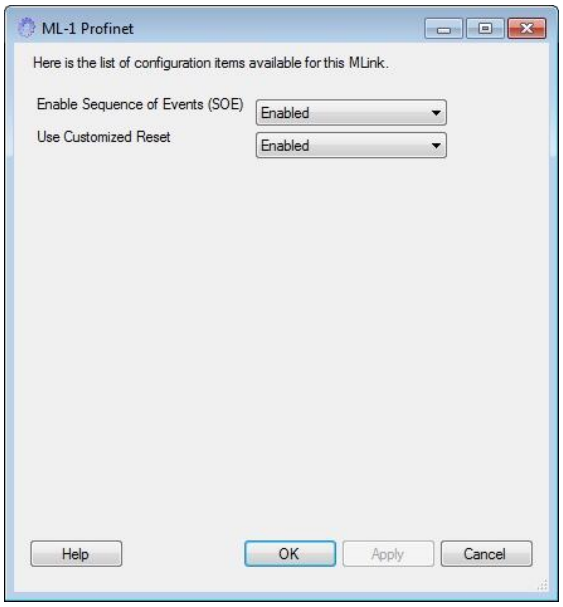
Example:

When a “Main Switch Supervision” alarm is sent the description will be “ALARM: Main Switch Supervision”.

Which events/alarms/trips that are actually sent to the IO Controller depends on selected functions in MNS Engineer.

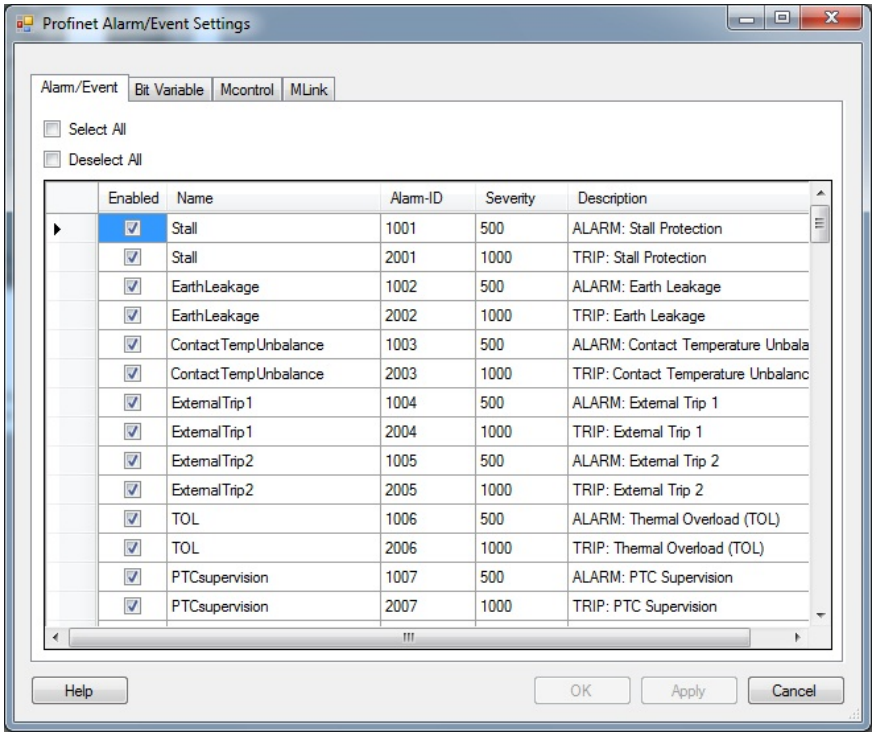
Configuring SOE

The SOE functionality can be enabled/disabled in M*Navigate*. The parameters are located under the M*Link* in *Configure → Fieldbus → MLink Configuration*.



In addition it is also possible to enabled/disable individual events/alarms/trips. The message description that is sent to the IO Controller can be customized along with the severity of the event. As default severity 1 is used for events, 500 for alarms and 1000 for trips on a 1-1000 scale.

The configuration for this is found under the M*Link* in *Configure → Fieldbus → Alarm/Event Configuration → Alarm/Event Settings*.



The *Name* and *Alarm-ID* are fixed and can not be changed. To enabled/disable an individual event, check/uncheck the checkbox under *Enable*. To change *Description* or *Severity* edit the cell with the new value.

Disabling an event/alarm/trip only disables the transmission of the event to the IO Controller not the functionality in the M*Control*.

Redundancy

Dual device redundancy is possible with PROFINET Interface. Status and command handling for the redundancy is done via submodules (Redundancy Control X) that resides under the DAP. With these submodules status for primary and redundancy error can be read. A switch-over command can be sent to the primary M*Link* to switch Primary/Backup mode on the dual M*Link*s.

In a dual redundancy configuration two M*Link*s work together. Both M*Link*s have connection to the DCS and the internal switchgear bus but only one is active (primary) and the other is hot standby (backup). In case of a power loss or any interruption in the connections of the active M*Link* the backup M*Link* becomes active (primary) one.

The two M*Link*s are two different units with different IP addresses on the same network. This means that they need to have different Station Names so they can be differentiated. Automatically a suffix will be appended to the name of the M*Link* depending on if it is set to start up as primary or backup. If it starts up as primary then “-1” is appended, if it starts up as backup “-2” is appended.

Example:

- The name of the M*Link*s is “ml-0000000678”.
- The name of the primary M*Link* will be “ml-0000000678-1”.
- The name of the backup M*Link* will be “ml-0000000678-2”.

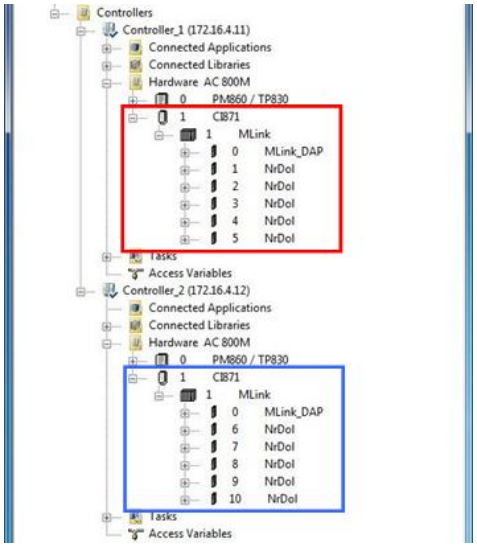
See section Redundancy Control for information about IO data.

Failsafe

The failsafe functionality works individually on the starters once the DCS/PLC connects. If the DCS/PLC connection between M*Link* and DCS/PLC is lost, failsafe is only activated on the starters that were connected to the missing DCS/PLC. All other starters remain as they were, i.e. no activation of the failsafe function.

The configuration of which starters/M*Control*s are controlled by which IO Controller is done in the DCS/PLC engineering tool.

Here is an example with the engineering tool for ABB's AC800M controller. The tool is called Control Builder M (CBM). In this example two PROFINET IO Controllers are configured to connect to the same M*Link* and control different starters/M*Control*s.



The red rectangle shows the first PROFINET IO Controller and the blue rectangle shows the second PROFINET IO Controller.

This structure is configured in the normal engineering procedure. The engineer adds the M*Link* to the IO Controller and then which starters/M*Control*s it should control under the MLink. This has been done for each of the IO Controllers in the example above. As can be seen the first IO Controller will control M*Control* 1 to M*Control* 5 and the second IO Controller will control M*Control* 6 to M*Control* 10. The MLink of both IO Controllers are set up to connect to the same MLink.

During the connection establishment between an IO Controller and an IO Device several data frames are exchanged. In one of these frames the IO Controller sends its configuration to the IO Device. With this information the IO Controller and IO Device can check that the configuration in the IO Controller matches the actual hardware configuration of the IO Device. If for some reason the configuration doesn't match this will be indicated to the IO Controller. This procedure is specified in the PROFINET standards, see [1] and [2].

When the M*Link* receives the configuration from the IO Controller, this information is also be used to setup the failsafe mechanism. This means that in the example above the first IO Controller sends that it has configured M*Control* 1 to M*Control* 5 to the M*Link*. This information is used to setup the failsafe settings automatically. The second IO Controller is configured in the same way.

When both IO Controllers have established the connection, the M*Link* has information regarding which M*Control*s are controlled by which IO Controller. If one connection is broken, the M*Link* will put only those M*Control*s that was controlled by the lost IO Controller to the failsafe state.

Redundancy

When redundancy is configured there is a 250 ms timeout on failsafe activation when a DCS connection is lost. If a DCS connection is lost and the backup M*Link* still have DCS connections alive then there will be switch-over between the M*Link*s. If no switch-over has been done within 250 ms the failsafe will be activated on affected starters.

Identification & Maintenance

MNS *i*S supports Identification & Maintenance (I&M) functions 0-4. I&M0 is mandatory and holds information for version, profile and which other I&M functions are supported. I&M1-4 are optional and supported by MNS *i*S. The contents of I&M functions 0-4 are defined by the PROFINET standard [1]. I&M5-15 are manufacturer specific and not supported by MNS *i*S.

Short summary of the contents in the supported functions:

- **I&M0:** Contains vendor identification and version information.
- **I&M1:** Contains tag for function and location of the PROFINET device.
- **I&M2:** Contains current date and time in the PROFINET device.
- **I&M3**: Contains a descriptor of the PROFINET device.
- **I&M4:** Contains a signature for identifying the PROFINET device.

The data contained in the I&M packets are described in the following sections.

I&M0 Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	BlockType (Unsigned16)							
2-3	BlockLength (Unsigned16)							
4	BlockVersionHigh (Unsigned8)							
5	BlockVersionLow (Unsigned8)							
6-7	VendorID (Unsigned16)							
8-27	OrderID (VisibleString[20])							
28-43	IM_Serial_Number (VisibleString[16])							
44-45	IM_Hardware_Revision (Unsigned16)							
46	IM_SWRevision_Prefix (VisibleString[1])							
47	IM_SWRevision_Functional_Enhancement (Unsigned8)							
48	IM_SWRevision_Bug_Fix (Unsigned8)							
49	IM_SWRevision_Internal_Change (Unsigned8)							
50-51	IM_Revision_Counter (Unsigned16)							
52-53	IM_Profile_ID (Unsigned16)							
54-55	IM_Profile_Specific_Type (Unsigned16)							
56	IM_Version_Major (Unsigned8)							
57	IM_Version_Minor (Unsigned8)							
58-59	IM_Supported (Unsigned16)							

I&M1 Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	BlockType (Unsigned16)							
2-3	BlockLength (Unsigned16)							
4	BlockVersionHigh (Unsigned8)							
5	BlockVersionLow (Unsigned8)							
6-37	IM_Tag_Function (VisibleString[32])							
38-59	IM_Tag_Location (VisibleString[22])							

I&M2 Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	BlockType (Unsigned16)							
2-3	BlockLength (Unsigned16)							
4	BlockVersionHigh (Unsigned8)							
5	BlockVersionLow (Unsigned8)							
6-37	IM_Date (VisibleString[16])							

I&M3 Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	BlockType (Unsigned16)							
2-3	BlockLength (Unsigned16)							
4	BlockVersionHigh (Unsigned8)							
5	BlockVersionLow (Unsigned8)							
6-37	IM_Descriptor (VisibleString[54])							

I&M4 Data

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	BlockType (Unsigned16)							
2-3	BlockLength (Unsigned16)							
4	BlockVersionHigh (Unsigned8)							
5	BlockVersionLow (Unsigned8)							
6-37	IM_Signature (OctetString[54])							

Description of IM Data

Name	Data type	Description
BlockType	Unsigned16	Indicates which data block. I&M0: 0x0020 I&M1: 0x0021 I&M2: 0x0022 I&M3: 0x0023 I&M4: 0x0024
BlockLength	Unsigned16	The length of the block as described above excluding the BlockType and BlockLength.
BlockVersionHigh	Unsigned8	Always 0x01
BlockVersionLow	Unsigned8	Always 0x00
VendorID	Unsigned16	Always 0x001A (ABB)
OrderID	VisibleString[20]	Always ‘NA ‘. (Always 20 octets long, non used octets are filled with blanks.)
IM_Serial_Number	VisibleString[16]	Always ‘NA ‘. (Always 16 octets long, non used octets are filled with blanks.)
IM_Hardware_Revision	Unsigned16	Hardware revision number (Not used)
IM_SWRevision_Prefix	VisibleString[1]	One character describing the version.
IM_SWRevision_Functional_Enhancement	Unsigned8	Version number (Not used)
IM_SWRevision_Bug_Fix	Unsigned8	Version number (Not used)
IM_SWRevision_Internal_Change	Unsigned8	Version number (Not used)
IM_Revision_Counter	Unsigned16	Revision number of the Profinet Interface Application
IM_Profile_ID	Unsigned16	Always 0x0000
IM_Profile_Specific_Type	Unsigned16	Always 0x0000
IM_Version_Major	Unsigned8	Always 0x01
IM_Version_Minor	Unsigned8	Always 0x01
IM_Supported	Unsigned16	Always 0x001e (Support for I&M0-I&M4)
IM_Tag_Function	VisibleString[32]	The name of the M*Link* or ‘GenericMLink’
IM_Tag_Location	VisibleString[22]	M*Link* location
IM_Date	VisibleString[16]	Date and time in the M*Link*. Format ‘YYYY-MM-DD HH:MM’
IM_Descriptor	VisibleString[54]	Always ‘ABB MNS iS MLink Profinet IO Device’ (Always 54 octets, if shorter filled with blanks)
IM_Signature	OctetString[54]	‘MLink Uuid: ‘ followed by the Uuid of the M*Link*.

Starter types and data description

In MNS *i*S a starter is modeled as a PROFINET module and can be instantiated on slot 1-60. All starters have different measurement values and commands that are modeled as submodules. The submodules can be instantiated on subslots and are described in detail below.

Reserved slots

The available slots in the M*Link* are 0-60. Number 0 is reserved for a special purpose.

Slot 0 is used for the Device Access Point (which is M*Link* itself). For status and IO data exchange with the M*Link* itself a slot must be used, hence slot 0 addresses the M*Link* and *not* a starter.

Control Access

Control Access (CA) is a mechanism within MNS *i*S to define and determine which interface has control rights to operate the M*Control*, these interfaces are defined below in command handling. Control Access rights can be given, for example, by a specific command sent to switch operation rights from push-button (hardwired to M*Control*) to any other interface connected via the M*Link* (e.g. M*View* or DCS).

Command handling

The control access command defines the control rights of that interface for a M*Control*.

Remote – M*Control* switches to Remote operation mode and can be operated via Fieldbus from process control system (DCS/PLC). This is called Auto Mode in the PROFINET IO data.

Bus-Local – M*Control* switches to Bus-Local mode and operation is possible:

- via M*View* (local operation panel in switchgear) or
- via web interface (similar to M*View*).

Soft-Local – M*Control* switches to local mode, and operation is possible via digital in and outputs on M*Control*. Soft-Local does not require a hardwire input to be set. Soft-Local may only be activated by a command from DCS or M*View*.

Hardware-Local – M*Control* switches to the Hardware-Local mode and operation is possible only through digital inputs on M*Control* hardware. In order to enable Hardware-Local, a hardwire input must be set with M*Navigate*.

Command execution

The status *Auto Mode* bit must be set to one (1) in order to execute commands from a process control system. *Auto Mode* can be set by sending the command *Auto Mode* (*Auto Mode* can not be set if *Hardware Local* is active). While the command *Auto Mode* bit is true, other stations (e.g. M*View*) can't set Control Access to Soft Local or Bus Local. If other stations should be permitted to change Control Access, the command *Auto Mode* bit should be set to false in the process control system.

Some of the commands in the control submodules are grouped together (Byte 0, bit 0-2). These are the “Run” (e.g. *Run*, *Run Forward*, *Closing*) and the *Off* bits. Only one bit in a group may be active simultaneously, if more than one bit is active the *Off* command will be issued. For example, if *Run Forward* and *Run Reverse* are simultaneously active in the RevDol Control submodule both will be ignored and an *Off* command will be sent to the M*Control*.

Command priority

For Control Access the *Auto Mode* command has priority over *Bus Local* and *Soft Local*. *Hardware Local* has priority over *Auto Mode*.

Device Access Point

The Device Access Point is the top level in the PROFINET addressing structure. This is where the connection is made, and then all modules and submodules are addressed under the Device Access Point. Slot 0 is reserved for the Device Access Point and this must always be configured in the DCS.

The Device Access Point in MNS *i*S is the M*Link*, it provides the actual connection from DCS to MNS *i*S.

Submodules can also be attached to the Device Access Point and hence IO data can also be exchange on the Device Access Point level. This is used in MNS *i*S to exchange IO data that concerns the M*Link* itself and not any particular starter, such as redundancy management.

The following sections describe the Device Access Point available and the belonging submodules.

MLink

MLink Status

Doesn't' contain any data only the standard IOPS/IOCS status byte. Some DCS systems must have at least one submodule configured under the DAP, in these cases this can be used.

Redundancy Control

There are 4 Redundancy Control submodules (1, 2, 3 and 4). They all have the same IO data described below. The reason for having 4 identical submodules is to allow 4 different IO Controllers to be connected to the same DAP (M*Link*) and at the same time allow each of the 4 IO Controllers to be the only one connected to a redundancy submodule. Only one IO Controller will have write access to a submodule, meaning if all 4 IO Controllers would be connected to the same redundancy submodule only one of them would be able to send the redundancy commands to the M*Link*. With one submodule for each IO Controller each of the IO Controllers will get write access and be able to send the redundancy commands to the M*Link*.

The input area contains status if the M*Link* is in Primary mode and indication of redundancy error. If redundancy is *not* configured for MNS *i*S and this submodule is still used then Primary will always be set to 1 (true) and redundancy error will always be 0 (false).

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	reserved	reserved	reserved	reserved	reserved	Redundancy Error	Primary

The Redundancy Switch-Over command changes the Primary mode on the M*Link*s (see Interface Manual Redundancy for more information). The redundancy Switch-Over command is detected on rising edge.

The Switch-Over command is only effective when sent to the Primary M*Link*.

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	reserved	reserved	reserved	reserved	reserved	reserved	Redundancy Switch-Over

Modules

Each starter type is modeled as module in PROFINET. Every module has submodules, which groups the IO data. The valid submodules for each module are described in subsections to the modules.

NrDol, NrDol RCU, NrDol SD, NrDolSoftStarter

NrDol Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto Mode	reserved	Overload Warning	Run	Off	reserved
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	Run	Off	reserved
1	reserved	reserved	Reserved	reserved	Bus Local	Soft Local	reserved	Reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

RevDol, RevDol RCU

RevDol Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	Overload Warning	Run Forward	Off	Run Reverse
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	Run	Off	Run

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
						Forward		Reverse
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Actuator

Actuator Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	Overload Warning	Opening	Off	Closing
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	Open	Off	Close
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

No Starter Module

The No Starter Module is only used in special circumstances. It exists for when the M*Control* is used only as a remote IO, i.e. is no M*Start* exists for it.

No Starter Module Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	reserved	Auto Mode	Reserved	reserved	reserved	reserved	reserved
1	Life Bit	reserved	reserved	Reserved	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	reserved	Auto	Reserved	reserved	reserved	reserved	reserved
1	reserved	reserved	reserved	Reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Transparent

Transparent Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	Overload Warning	K3	K2	K1
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	K3	K2	K1
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

MFeed

MFeed Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	reserved	reserved	reserved	On	Off	reserved
1	Life Bit	reserved	Test	reserved	reserved	reserved	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

CFeed, CFeed RCU

CFeed Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	reserved	On	Off	reserved
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	On	Off	reserved
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Transparent MFeed

Transparent MFeed Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	reserved	reserved	Overload Warning	On	Off	reserved
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Transparent CFeed

Transparent CFeed Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	Overload Warning	On	Off	reserved
1	Life Bit	Ready	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	On	Off	reserved
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Sace CBR

CBR Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Overload Warning	Spring Charged	UV Release	reserved	State of CBR		Position of CBR	
1	Auto Mode*	Release Reason			Life Bit	Write Protection Activated**	Warning	reserved

* Auto Mode indicates the M*Connect* is in Control Access mode “Remote” meaning it will accept commands from DCS/PLC/PCS.

** Write Protection Activated means the Circuit Breaker is in local mode (Control Access mode Hard Local).

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	reserved	Auto Mode	reserved	CB Reset	Trip Reset	Switching Operation	
1	reserved	reserved	reserved	reserved	reserved	reserved	reserved	reserved

CBR Current

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-3	Phase Current L1 [A] (Unsigned32)*							
4-7	Phase Current L2 [A] (Unsigned32)*							
8-11	Phase Current L3 [A] (Unsigned32)*							

* Invalid value from Circuit Breaker will result in the value 0 (zero) on the fieldbus.

CBR Voltage

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-3	L1 – L2 Voltage [V] (Float32)*							
4-7	L2 – L3 Voltage [V] (Float32)*							
8-11	L3 – L1 Voltage [V] (Float32)*							

* Invalid value from Circuit Breaker will result in the value 0 (zero) on the fieldbus.

CBR Power

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-3	Total Power Factor (Float32)*							
4-7	Total Active Power [kW] (Float32)*							
8-11	Total Reactive Power [kVAR] (Float32)*							
12-15	Total Apparent Power [kVA] (Float32)*							

* Invalid value from Circuit Breaker will result in the value 0 (zero) on the fieldbus.

Common Submodules

This starter type can use the submodule “General Purpose IO”.

DC MFeed

DCFeed Control

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	Warning	Fault	Auto mode	reserved	reserved	On	Off	reserved
1	Life Bit	reserved	Test	Trip Reset Possible	reserved	reserved	reserved	reserved

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	reserved	Trip Reset	Auto	reserved	reserved	reserved	reserved	reserved
1	reserved	reserved	reserved	reserved	Bus Local	Soft Local	reserved	reserved

Common Submodules

This starter type can also use the common submodules that are listed in Section Common Submodules (see the section for exact which submodules that is supported).

Common Submodules

The submodules mentioned here are common for most of the modules. Each submodule below will mention exactly which modules they support.

Measurements

This submodule may be used for all modules (starter types) except for No Starter Module, Sace CBR and DC MFeed.

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	Current Phase L1 in % (Unsigned 16)							
2-5	Active Power (Float32)							
6-9	Cos Phi (Float32)							

Measurements DC

This submodule may only be used with the DC Feed module.

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	DC Current in % (Unsigned 16)							
2-5	Active Power (Float32)							

Thermal Overload

This submodule may be used for all modules (starter types) except for No Starter Module and Sace CBR.

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0-1	Thermal Image (Unsigned16)							
2-3	Time To Trip (Unsigned16)							
4-5	Time To Reset (Unsigned16)							

General Purpose IO

This submodule may be used by all modules (starter types) except for No Starter Module.

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	GPI 8	GPI 7	GPI 6	GPI 5	GPI 4	GPI 3	GPI 2	GPI 1

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	GPO 8	GPO 7	GPO 6	GPO 5	GPO 4	GPO 3	GPO 2	GPO 1

General Purpose IO Extended

This submodule may only be used with the No Starter Module.

Input to controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	GPI 8	GPI 7	GPI 6	GPI 5	GPI 4	GPI 3	GPI 2	GPI 1
1	GPI 16	GPI 15	GPI 14	GPI 13	GPI 12	GPI 11	GPI 10	GPI 09

Output from controller

Byte	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	GPO 8	GPO 7	GPO 6	GPO 5	GPO 4	GPO 3	GPO 2	GPO 1

Description of data

Input to controller

Name	Data type	Description
On	Bit	1 = Motor/Feeder is on (closed)
Off	Bit	1 = Motor/Feeder is stopped or tripped (open)
Run	Bit	1 = Motor is running
Overload Warning	Bit	1 = Warning level for TOL is reached (for the CBR this is linked to L-PreAlarm).
Auto mode	Bit	1 = Accepts control commands via PROFINET
Fault	Bit	1 = One or more protections are in Trip state
Warning	Bit	1 = One or more protections are in Warning state
Trip Reset Possible	Bit	1 = Trip reset possible
Test	Bit	1 = M*Start* in test position. Main switch off but contactor control possible.
Ready	Bit	1 = M*Start* connected, main switch on, no active trip and no start inhibit, not already started (all in all this indicates ready to start).
Life Bit	Bit	1 = M*Control* / M*Connect* is present
Run Reverse	Bit	1 = Motor is running counter clockwise
Run Forward	Bit	1 = Motor is running clockwise
Closing	Bit	1 = Actuator is closing
Opening	Bit	1 = Actuator is opening
K1	Bit	1 = Contactor K1 closed 0 = Contactor K1 open
K2	Bit	1 = Contactor K2 closed

Name	Data type	Description
		0 = Contactor K2 open
K3	Bit	1 = Contactor K3 closed 0 = Contactor K3 open
Primary	Bit	1 = M*Link* is primary 0 = M*Link* is backup
Redundancy Error	Bit	1 = Error with redundancy 0 = No redundancy error
Current Phase L1 in %	Unsigned16	Motor current in phase L1 in % of nominal current
DC Current in %	Unsigned16	DC current in % of nominal current
Thermal Image	Unsigned16	
Time To Trip	Unsigned16	
Time To Reset	Unsigned16	
GPI 1	Bit	
GPI 2	Bit	
GPI 3	Bit	
GPI 4	Bit	
GPI 5	Bit	
GPI 6	Bit	
GPI 7	Bit	
GPI 8	Bit	
GPI 9	Bit	
GPI 10	Bit	
GPI 11	Bit	
GPI 12	Bit	
GPI 13	Bit	
GPI 14	Bit	
GPI 15	Bit	
GPI 16	Bit	
Cos Phi	Float32	
Active Power	Float32	
Position of CBR	2 Bits	00 = Isolated 01 = Connected 10 = Test 11 = No Slave Communication (missing or communication broken) (Only valid for the Sace CBR)
State of CBR	2 Bits	00 = Undefined State 01 = Opened 10 = Closed 11 = Tripped

Name	Data type	Description
		(Only valid for the Sace CBR)
UV Release	Bit	1 = Undervoltage trip (Only valid for the Sace CBR)
Spring Charged	Bit	1 = Springs are loaded (Only valid for the Sace CBR)
Write Protection Activated	Bit	The Sace Circuit Breaker is in local mode an no external commands are allowed. (Only valid for the Sace CBR)
Release Reason	3 Bits	000 = No Trip 001 = L Tripped 010 = I Tripped 011 = S or S2 Tripped 100 = G or Gext Tripped 101 = not used 110 = not used 111 = Tripped but with no futher information (Only valid for the Sace CBR)
Phase Current L1	Unsigned32	(Only valid for the Sace CBR)
Phase Current L2	Unsigned32	(Only valid for the Sace CBR)
Phase Current L3	Unsigned32	(Only valid for the Sace CBR)
L1-L2 Voltage	Float32	(Only valid for the Sace CBR)
L2-L3 Voltage	Float32	(Only valid for the Sace CBR)
L3-L1 Voltage	Float32	(Only valid for the Sace CBR)
Total Power Factor	Float32	(Only valid for the Sace CBR)
Total Active Power	Float32	(Only valid for the Sace CBR)
Total Reactive Power	Float32	(Only valid for the Sace CBR)
Total Apparent Power	Float32	(Only valid for the Sace CBR)

Output from controller

Name	Data type	Description
On	Bit	1 = M*Control* will start/close motor/feeder.
Off	Bit	1 = M*Control* will stop/open motor/feeder.
Run	Bit	1 = M*Control* will start motor.
Auto	Bit	1 = Instructs M*Control* to accept control commands from remote location.
Trip Reset	Bit	1 = To reset any trip condition of the according motor starter (possible when “Trip Reset Possible” is set to one (1))
Soft Local	Bit	1 = Control Access is passed to a local control station.

Name	Data type	Description
Bus Local	Bit	1 = Control Access is passed to any control station on the switchgear control network (M*View* or Web Browser).
Run Reverse	Bit	1 = M*Control* will start motor clockwise.
Run Forward	Bit	1 = M*Control* will start motor counter clockwise.
Close	Bit	1 = Close actuator
Open	Bit	1 = Open actuator
K1	Bit	1 = Close contactor 1 0 = Open contactor 1
K2	Bit	1 = Close contactor 2 0 = Open contactor 2
K3	Bit	1 = Close contactor 3 0 = Open contactor 3
Redundancy Switch-Over	Bit	Performs a switch-over on rising edge
GPO1	Bit	1 = GPO1 is set. 0 = GPO1 is not set.
GPO2	Bit	1 = GPO2 is set. 0 = GPO2 is not set.
GPO3	Bit	1 = GPO3 is set. 0 = GPO3 is not set.
GPO4	Bit	1 = GPO4 is set. 0 = GPO4 is not set.
GPO5	Bit	1 = GPO5 is set. 0 = GPO5 is not set.
GPO6	Bit	1 = GPO6 is set. 0 = GPO6 is not set.
GPO7	Bit	1 = GPO7 is set. 0 = GPO7 is not set.
GPO8	Bit	1 = GPO8 is set. 0 = GPO8 is not set.
Switching Operation	2 Bits	00 = not used 01 = Open 10 = Close 11 = not used (Only valid for the Sace CBR)
Trip Reset	Bit	(Only valid for the Sace CBR)
CB Reset	Bit	(Only valid for the Sace CBR)

Limitations

- Maximum of 4 concurrent Application Relationships (AR's)
- It is not possible to set persistent IP address and/or station name via DCP
- Only PROFINET IO RT communication is supported, not NRT or IRT
- When downloading VSD files (MControl Data Definitions / MControl Application) it takes about 1 minute for Profinet interface to detect and reconfigure.
- If a drive type in DeviceList is changed, added or removed and downloaded to MLink an active Profinet communication (AR) will be interrupted for about 1 minute.
- User define data maps are not supported.
- Locked by other controller' When several Profinet IO Controllers connect to the same submodule (MLink), only 1 can be the owner. Indications of status may be incorrect in the controllers. No current workaround is possible.
- Profinet IO communication is supported for ABB 800xA System only, no 3rd Party interfaces are supported.

The GSDML file describes default data to communicate via PROFINET, notice that there is only support for one full Ethernet frame to be transmitted per AR. This means that the sum of all data in one direction per AR must not exceed 1440 bytes.

Troubleshooting

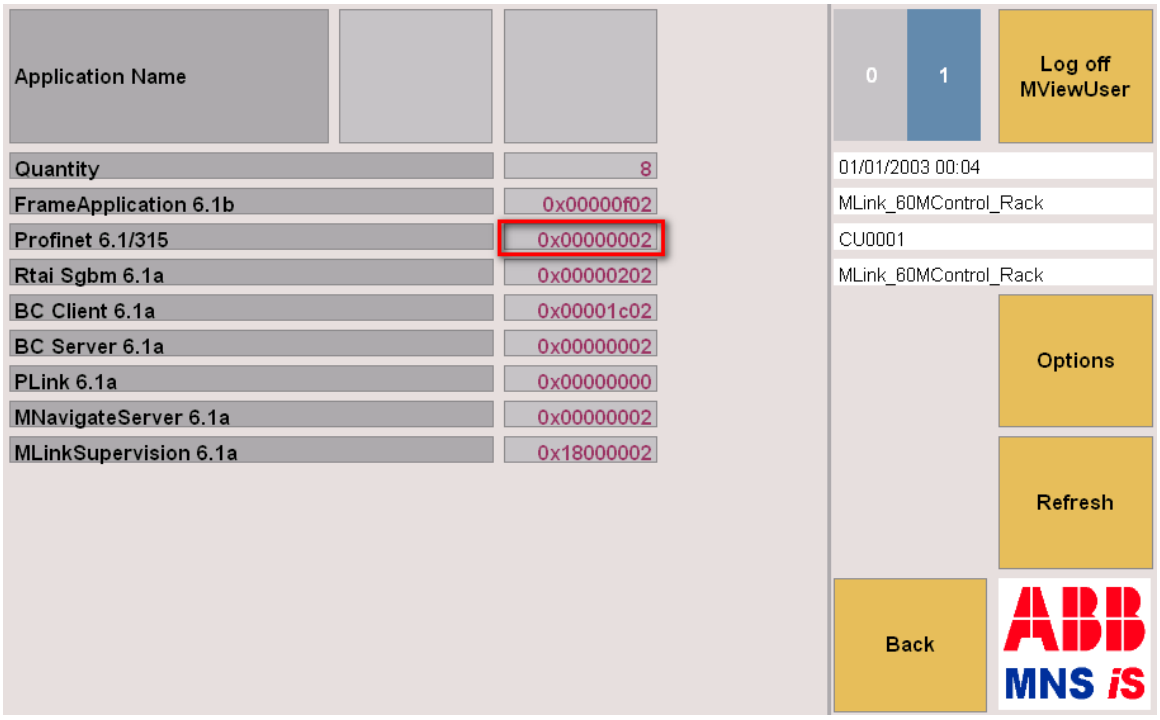
The M*Link* PROFINET application is monitored. The status LED 6 on M*Link* front indicates the PROFINET communication status.

If the LED is off the communication between M*Link* and PROFINET Controller is not active.

Please check:

- Cable connections and shielding
- IP address settings
- PROFINET Controller configuration

Report the “Application Information” code found in M*View* of the PROFINET application to support organization.



Application Information

The meaning of the number shown next to the PROFINET application in “Application Information” is described here. The number shown is 32 bits and each of the bit has a meaning of its own.

Bit	Description
Bit 31	Not used
Bit 30	Not used
Bit 29	Not used
Bit 28	Not used
Bit 27	Not used
Bit 26	Not used
Bit 25	Not used
Bit 24	Not used
Bit 23	Not used
Bit 22	Not used
Bit 21	Not used
Bit 20	Not used
Bit 19	Not used
Bit 18	Not used
Bit 17	Not used
Bit 16	Not used
Bit 15	System trap (Fatal error)
Bit 14	Not used
Bit 13	Not used
Bit 12	Not used
Bit 11	Not used
Bit 10	Not used
Bit 09	Redundancy change-over command received
Bit 08	AR active (DCS connected)
Bit 07	Error/Warning parsing GSDML file
Bit 06	Error/Warning parsing VSD file
Bit 05	Error in RT IPC module
Bit 04	Error in PNIO IPC module
Bit 03	Error in PNIO kernel module
Bit 02	Fatal error
Bit 01	PROFINET application is running
Bit 00	PROFINET application is configuring

Contact us

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