



ReliaGear® LV MCC — FVNR, FVR, PSTX, ACS580, ATS

CUSTOMER TRAINING

2025

ENGINEERED
TO OUTFIT

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01

Overview

ReliaGear® LV MCC

ANSI low voltage motor control center

Key features

- Horizontal busbar at top of enclosure
 - Vertical bus isolated via polyester-reinforced sandwich
 - Withdrawable units for easy replacement
 - Disconnecting power and control terminal blocks
 - Arc flash mitigation units
 - Seismically certified for maximum rating (see enclosure slides for details)
-
- Serves ANSI/NEMA markets
 - Manufactured in Monterrey, Mexico
 - Adapted from the legacy GE E9000 product line



ReliaGear® MCC

UL 845 MCC — Standards

Specific standards

- UL 845, a tri-national standard including UL/cUL
 - Low voltage motor control centers
- CSA C22.2 No. 254-05
 - Low voltage motor control centers

Complementary standards

- UL 50 — Enclosures for electrical equipment
- UL 50E
 - Enclosures for electrical equipment, environmental considerations
 - UL 508 — Industrial control equipment
- NFPA 70E
 - National Electric Code Safety Requirements
- NEC — National Electric Code
- Seismic qualification according to IBC-2021, CBC-2022, AC156 as well as HCAI (formerly known as OSHPD)

ReliaGear® LV MCC

Overview

Technical data

Nominal voltage:

208 V AC, 240 V AC, 380 V AC, 480 V AC, 600 V AC

System types:

3 phases, 3 wires; 3 phases, 4 wires

Frequency:

50/60 Hz

Neutral bus (horizontal): 50% of the main bus ampacity
(800 A, 1200 A, 1250 A and 1600 A)

Ground bus (horizontal): 300 A, 600 A and 800 A

Ground bus (vertical): 150 A

Nominal current

Horizontal bus:

800–3200 A

Vertical bus:

300, 600/700/850 A

Short-circuit current (100 ms):

65 kA @ 600 V

100 kA @ 480 V

02

Construction

ReliaGear® LV MCC construction

Enclosure options

- NEMA 1
- NEMA 1HG
- NEMA 3R non-walk-in*
- Type 12

Footprint options

- Standard 90" height
- Standard 20" wide, optional 24", 30" and 36"
- Standard 20" deep, optional 13", 22" and 30"
- Bottom wireway 6" or 12"
- Top wireway 12"
- Vertical wireway 4" or 8"
- 25" back-to-back with shared main bus

Safety features

- Polyester-reinforced sandwich bus insulates vertical bus to help prevent the spread of faults, and small stab openings provide effective isolation
- Optional automatic shutter barrier covers vertical bus stab area when plug-in units are removed
- Padlock provisions
- Polycarbonate main bus barriers

Robust design

- Seismic rated IBC-2021/CBC-2022**
- 65 kAIC standard bus bracing
- 21x stronger latches
- Textured paint
- Main bus rated up to 3200 A without fans
- Rounded edges along wire access holes

* Excluding bus class 1.5, VFD drives and PSTX size 5 and above

** See seismic slide for more details

ABB

ReliaGear LV MCC



Main horizontal bus structures

2" main bus 600–2500 A and 1.5" main bus 2000–3200 A

2" main bus



2" main bus



1.5" main bus (MLO)



1.5" main bus (side view)



MCC enclosures

NEMA Type 1 — Semi dust-tight, indoor (1G)

Gasket around doors frame and front covers

NEMA Type 1HG — Heavy gasketed, indoor (1HG)

Same as (1G) plus floor plates.

NEMA Type 3R — Rain-proof, outdoor

Large enclosure that surrounds MCC

Internal is same as 1HG, except floor plates and top covers

NEMA Type 12 — Dust-tight, drip-tight, indoor

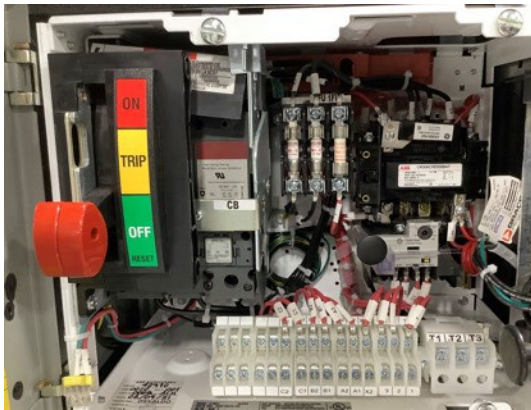
Same as 1HG plus rated door device, sealed devices



Class I vs Class II wiring

The NEMA classes are subdivided into B and C

- Class I B(D)** — Control wiring to terminal boards (**standard**)
- B(T)** — Power terminal (ReliaGear® sizes 1 and 2 only)
- C** — Master terminal boards
(Top, bottom or rear of section) sizes 1 through 5
Power cables (ReliaGear sizes 1 and 2 only)



ABB

ABB offers a NEMA IA modified MCC wiring choice (**1AM**). This type of MCC will be supplied without wiring and without control diagrams. But unlike NEMA “A” type wiring class, ABB can mount low voltage control devices on the pilot device bracket and supply terminal boards for more flexibility to original equipment manufacturers (OEMs).

ReliaGear® LV MCC seismic rating considerations

Product line	IBC-2021/CBC-2022			OSHPD certification	Notes (exclusions due to weight)
	Ip = 1.5 z/h = 1	Ip = 1.5 z/h = 0	Certification report		
	Sds	Sds			
ReliaGear® LV MCC	2.0 g	2.5 g	1089-316	OSP-0093 2024	Refer to IBC/CBC and OSP report for items that are not included in the certification

03

Mains, MLOs

Main devices and MLO

Main circuit breaker — SACE® Emax® 2

Air circuit breaker, UL 1066

Mains: 1200–2000 A (E2.2) 480 @ 100 kA / 600 A @ 85 kA, 2500 A and 3200 A (E4.2), 480/600 V @ 100 kA

Feeders: 800 A–2000 A (E2.2), 480 V @100 kA, 600 V @ 65 kA

Trip units:

- Ekip Touch LSI and LSI G
- Ekip Hi-Touch LSI and LSI G

Application notes:

- Fixed and draw-out available
- Main only, M-T-M not yet available
- Key locks must be kirk key

PowerBreak II/SACE® Tmax® XT main breaker

Insulated case circuit breaker, UL 489

PowerBreak II

Mains: 800 A–2500 A

Feeders: 800–2500 A

Application notes

- EntelliGuard® TU trip unit
- Fixed mounted/draw-out
- 100% rated frames up to 1600 A

Tmax XT main breaker

- Ekip DIP LSI and LSI G
- Ekip Touch LSI and LSI G
- Ekip Hi-Touch LSI and LSI G

Main lug only incoming

600 A–800 A

- Standard: Single mechanical lug
- Optional: NEMA mechanical, 2-hole lug
- Optional: NEMA compression lug

1200 A–3200 A

- Standard: NEMA mechanical 2-hole lug
- Optional: NEMA compression 2-hole lug



XT5



XT7



Emax 2



PBII

SACE® Emax® 2

Ekip trip units available in ReliaGear® LV MCC



	Ekip DIP	Ekip Touch	Ekip Hi-Touch	Ekip G Touch	Ekip G Hi-Touch
Application	Distribution protection	Distribution protection and control		Distribution protection and control + generator protection	
Versions	LI / LSI / LSI	LI / LSI / LSI	LSI / LSI	LSI	
2I / Dual settings	-	Second I protection (2I)	Dual protection settings	Second I protection (2I)	Dual protection settings
Measuring/metering	-	Upgradable	1% accuracy is standard		
Communications	Ekip Link	Bluetooth, Ekip Link, IEC 61850, Modbus TCP, Modbus RS-485, Profibus, Profinet, DeviceNet, EtherNet/IP			
Additional control	-	Signaling (I/Os), load management			

Technical manual for Ekip Touch trip units: [Document# 1SDH001316R0002](#)

O4

Starter Units

NAFM — Standard NEMA starters

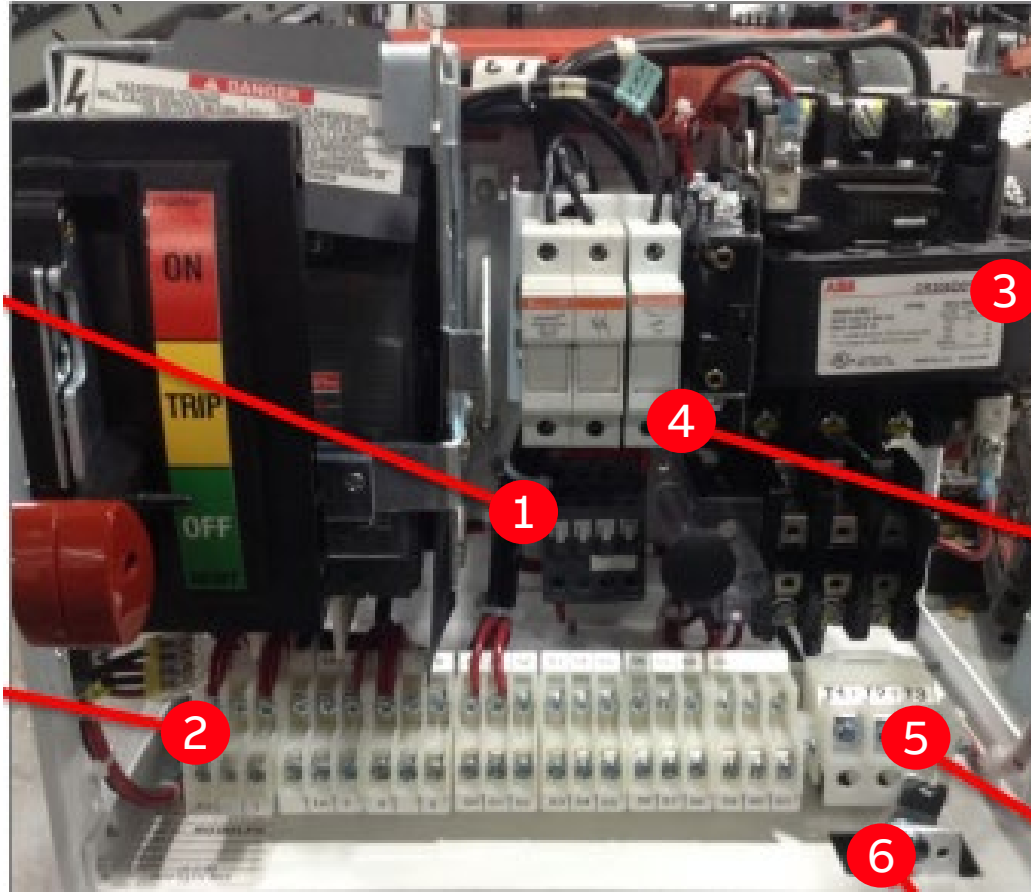
AFM — Arc flash mitigation (retractable stabs)

FVNR — Full voltage non-reversing

FVR — Full voltage reversing

ReliaGear LV MCC starter unit

- 1 Auxiliary control relay
- 2 30 A pull-apart control TBs
- 3 300-line NEMA starter
- 4 Front accessible CPT fuses and IP20 fuse holder
- 5 Optional: 50 A motor TBs NEMA 1BT wiring
- 6 Quarter-turn latches



Typical size 1 motor starter

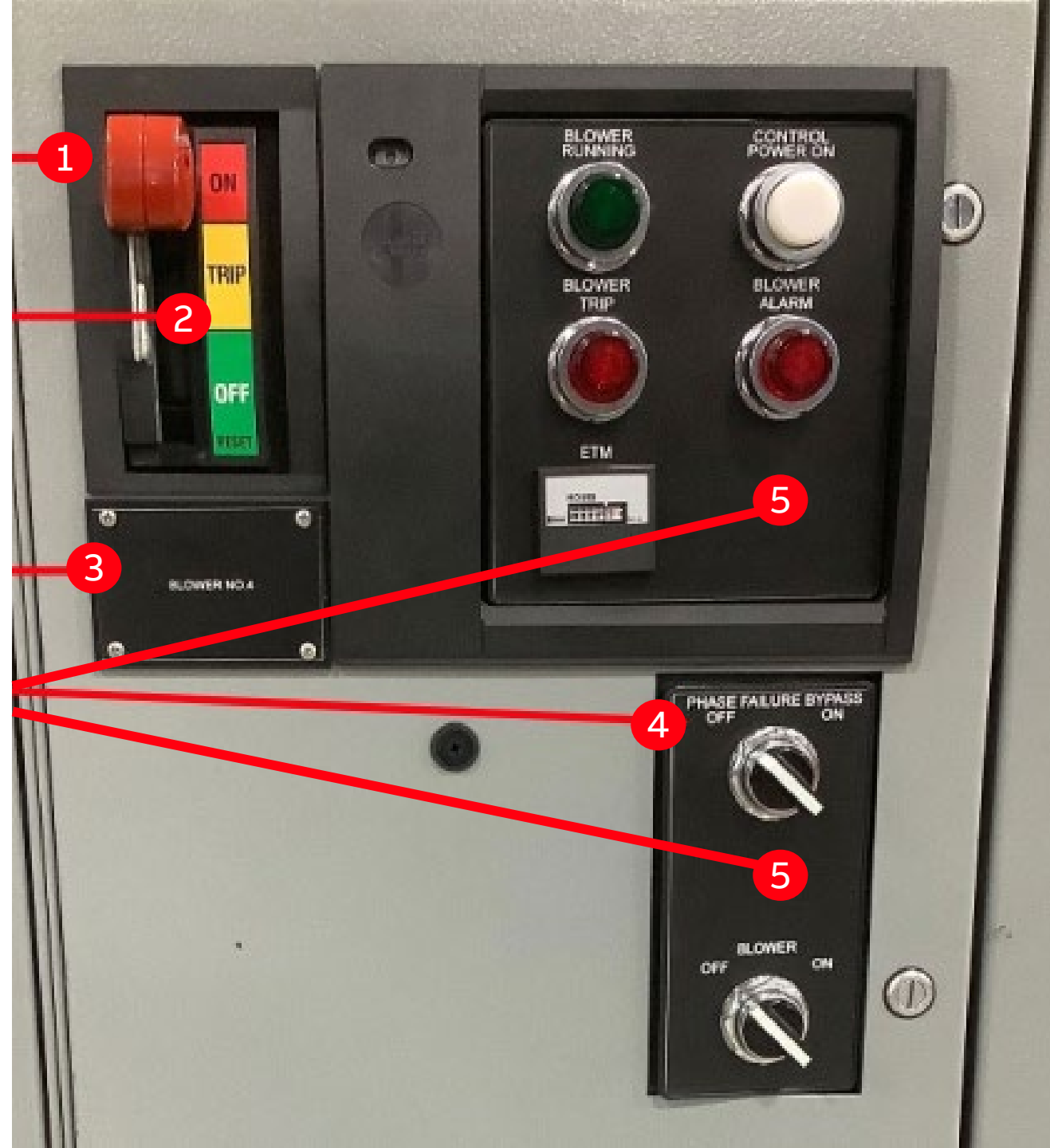


CR306 size 1 motor starter with solid-state overload relay installed

ReliaGear® LV MCC door device bracket

Functional appearance

- 1 Highly visible disconnect handle
- 2 Clearly marked disconnect position
- 3 Laser-engraved unit nameplate with optional stainless steel screw
- 4 Laser-engraved pilot devices
- 5 ReliaGear door device bracket can be provided by adding a 3-hole and 6-hole device bracket



Flexible plug-in units

Disconnect OFF



Quarter-turn door latches



Quarter-turn unit latches



Remove unit



FVNR unit sizing (size 1 and 3 examples)

Effect on unit sizing

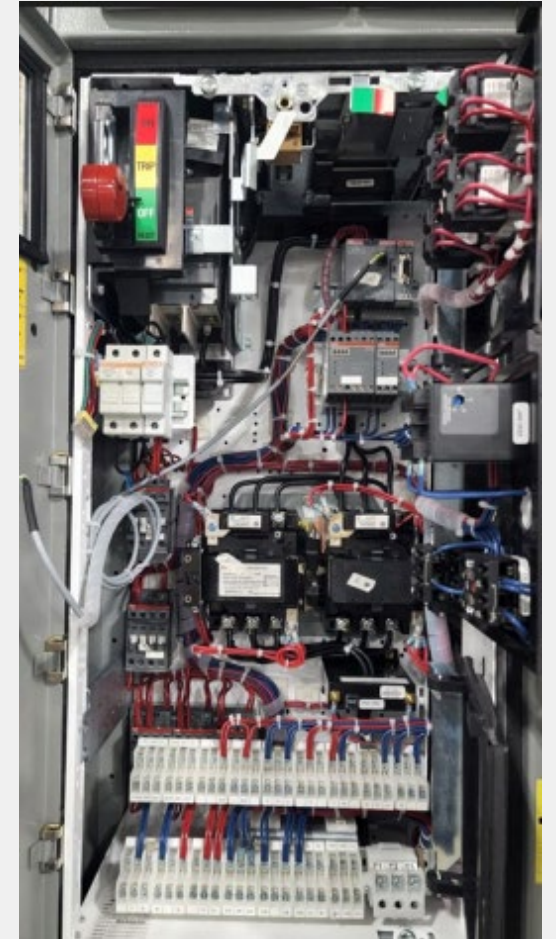
- Selected devices
- Number of terminal points
- Number of control relays
- Number of door devices



AFM FVR size 2 with multiple options

Features

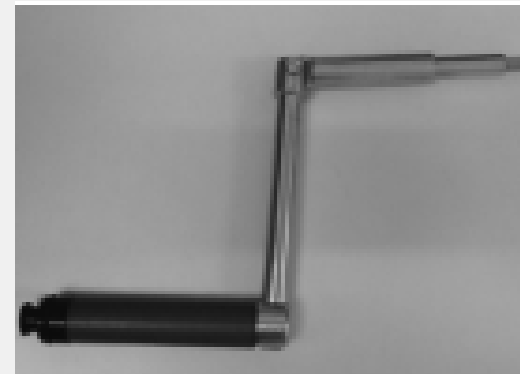
- AFM unit
- FVR contactor
- Starter coil suppressor
- Multiple door devices
- UMC100.3 smart relay
- Profibus communication
- Analog/temperature module
- UMC I/O expansion module
- Two-tier terminal board and power block
- GFM ground fault



Arc flash mitigation (AFM) units

Key values

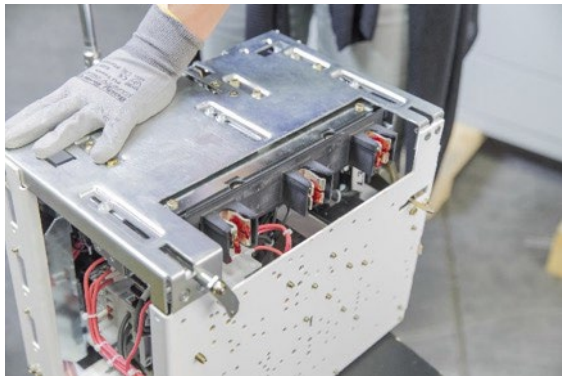
- Meets IEEE-1684-2014 guidelines
- Vertical bus shutter
- Stab engagement/disengagement with door closed
- Padlock provision — prevent unit insertion with extended stabs
- Visual indicators on unit
- Mechanical interlock options
- Remote racking option



AFM features

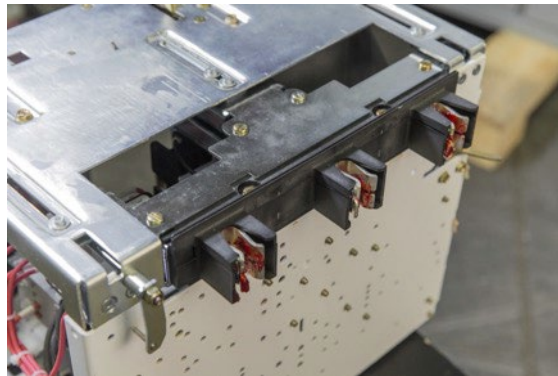
Stabs disengaged position

Stabs are shown here in fully retracted position.



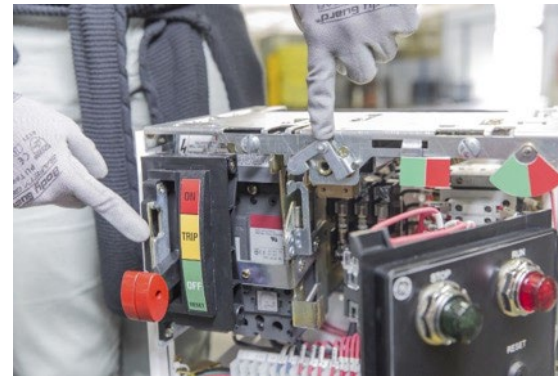
Stabs engaged position

Simple and robust guide structure to assist with proper alignment of the stabs and reliable operation.



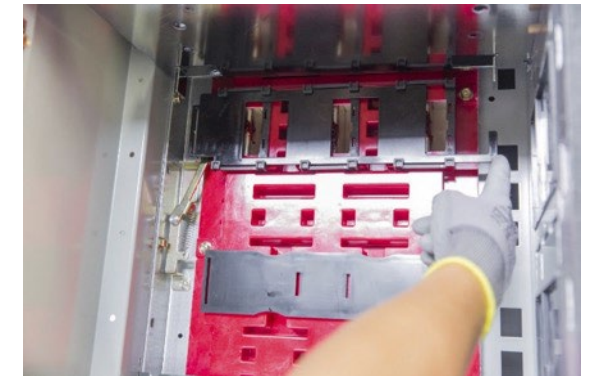
Racking screw interlock

Circuit breaker must be in “OFF” position for racking screw to be accessible.



Automatic shutters

While stabs engage with vertical bus, shutters will open to allow contact. While stabs disengage, shutters will close to isolate unit from vertical bus.



05

**Smart Overload
Relays**

Overload relay options

UMC100.3 microprocessor programmable overload relay

Protection features

- Thermal overload (Class 5, 10, 20, 30, 40)
- High current, low current
- Ground fault (internal calculation or external sensor)
- Phase loss, imbalance, reversal
- Voltage, power, power factor
- RTD input

Monitoring

- Number of starts
- Time to trip, thermal capacity (%)
- Up to 63 A in base module
- 24 V DC or 120 V AC supply
- Communication options
- Voltage monitoring option
- 6 discrete inputs (24 V DC only), 3 relay outputs
- Custom logic programming to simplify starter wiring

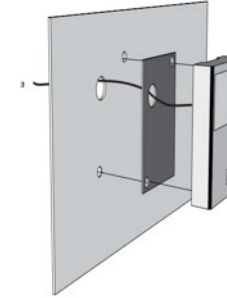


UMC-100.3 communication



DX122-FBP.0

VI150-FBP.0



UMC100-PAN



UMC100-PAN CAP

Fieldbus interfaces

Profibus, DeviceNet, Modbus RTU

Ethernet interfaces

Profinet (S2) redundancy, EtherNet/IP

Ethernet interfaces

MTQ22-FBP.0: Modbus TCP

PNQ22-FBP.0: Profinet IO



PNU32.0



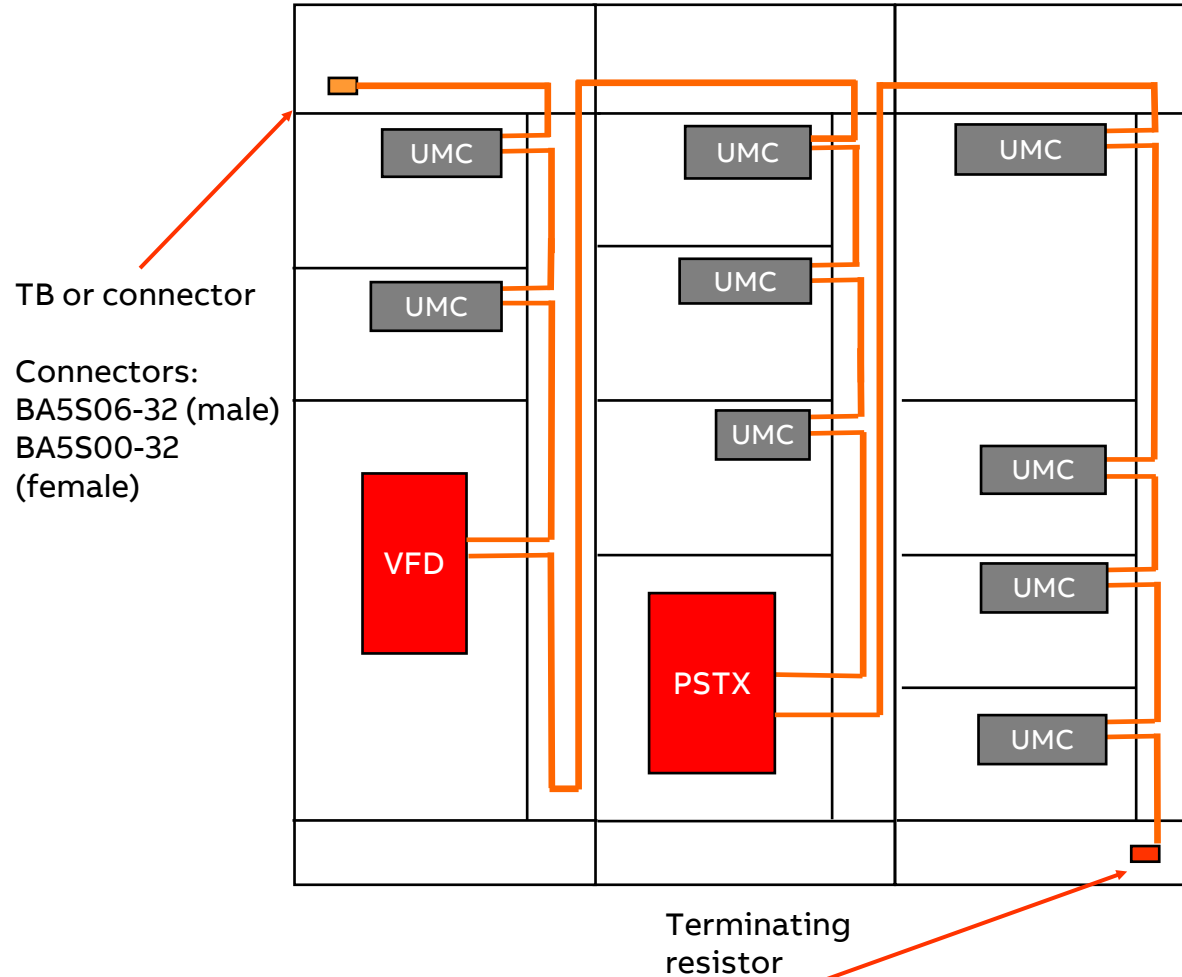
06

MCC

Communication

Wiring Typicals

Profibus DP network



Profibus DP network

Max. no. of devices = 32
(can use repeaters to extend up to 126 devices)

Cable: Shielded twisted pair
(Alpha Wire 6463)

Native devices available

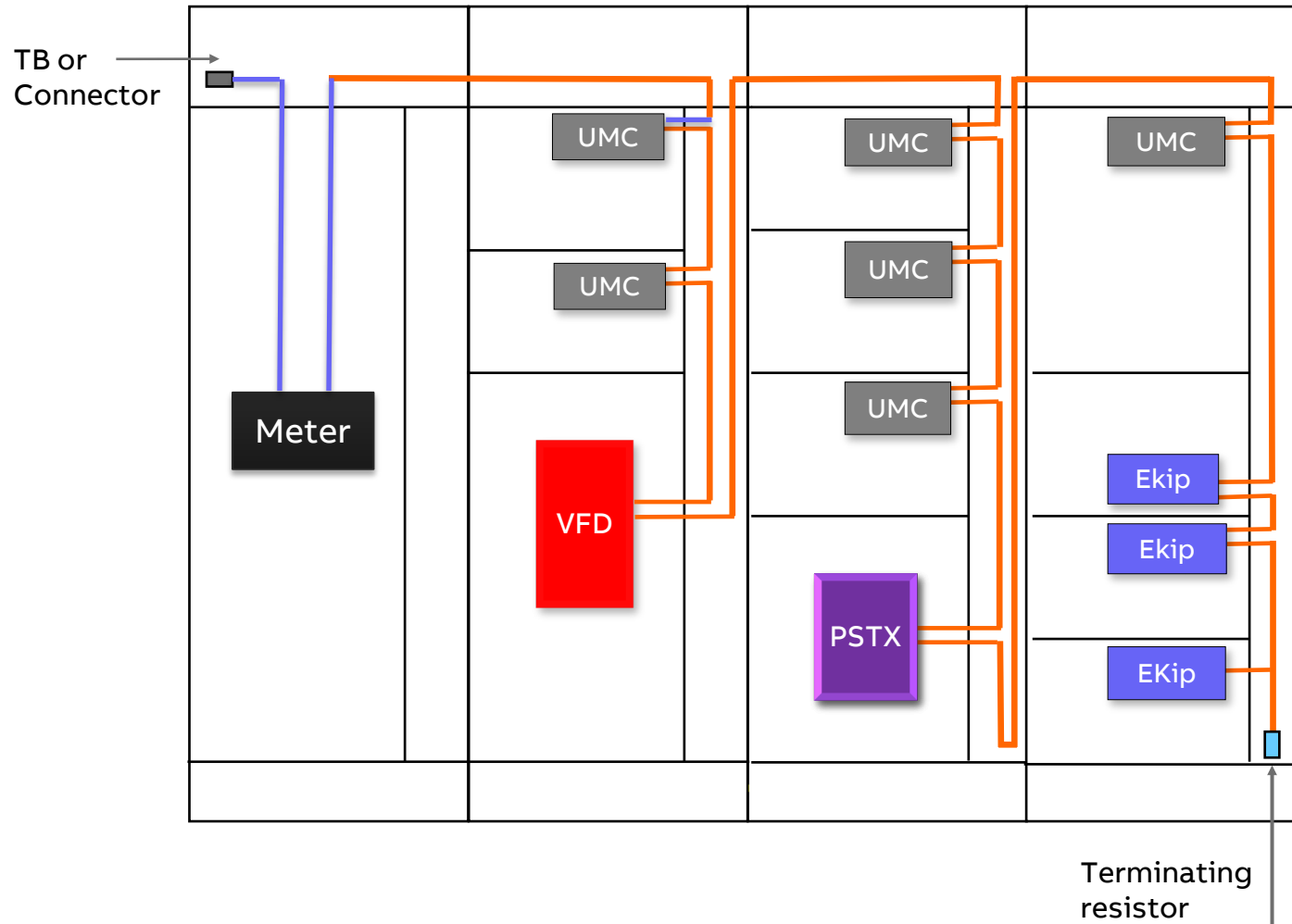
- UMC100.3
- ACS580 VFDs
- PSTX

Communication topology



PDF Document

Modbus RTU network



Modbus RTU network

Max. no. of devices = 32
(if fast response is required,
reduce number of inputs
per device)

Cable: Shielded twisted pair

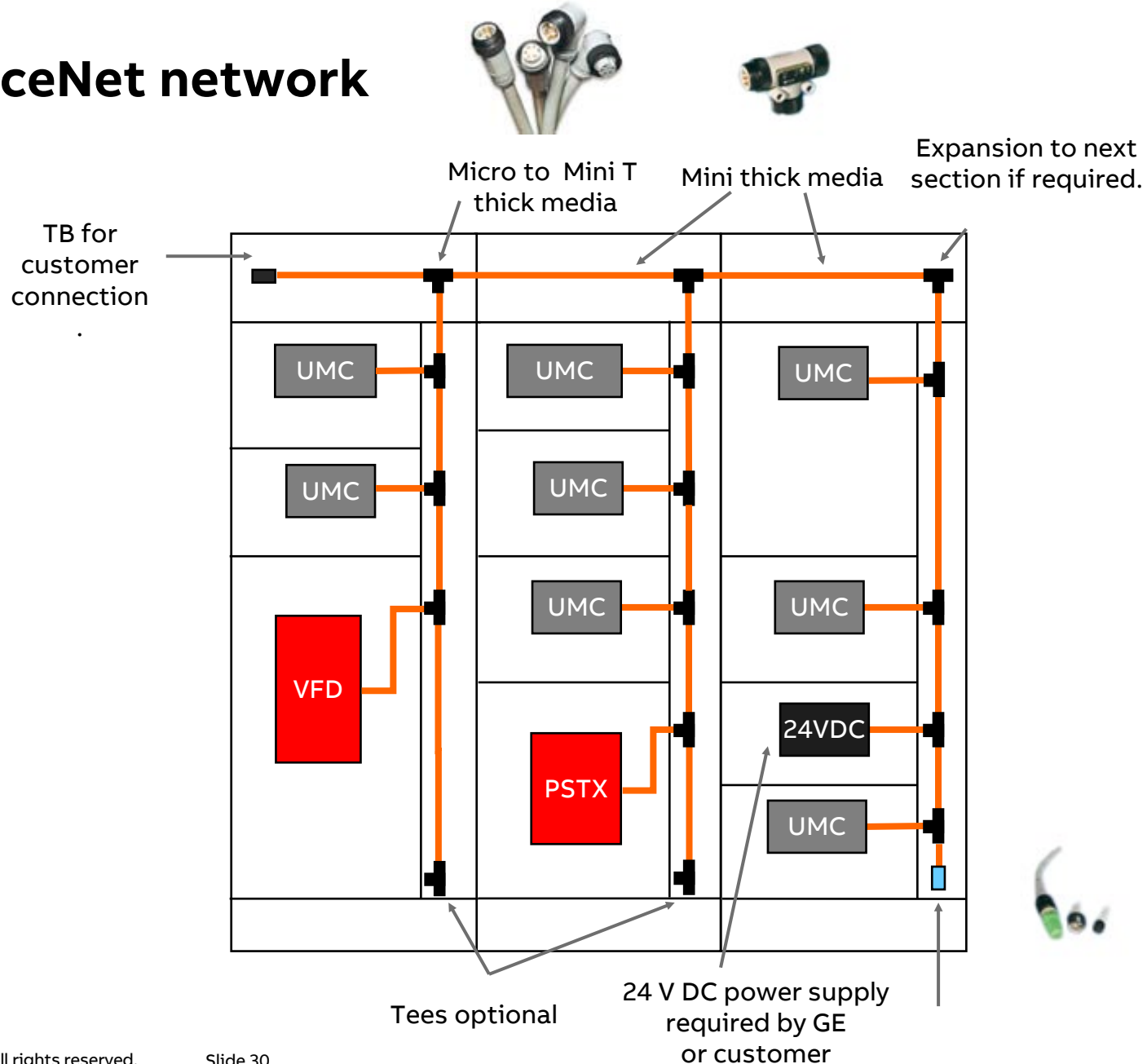
Devices

- UMC100.3
- MM300E
- ACS580 VFDs
- PSTX
- Meter
- Ekip Touch trip unit

Communication topology



DeviceNet network



DeviceNet network

Max. no. of devices = 64

Cable: Brad Harrison DN cables used with main trunk line and vertical drops into each section

Native devices available

- UMC100.3
- ACS580 VFDs
- PSTX

Communication topology

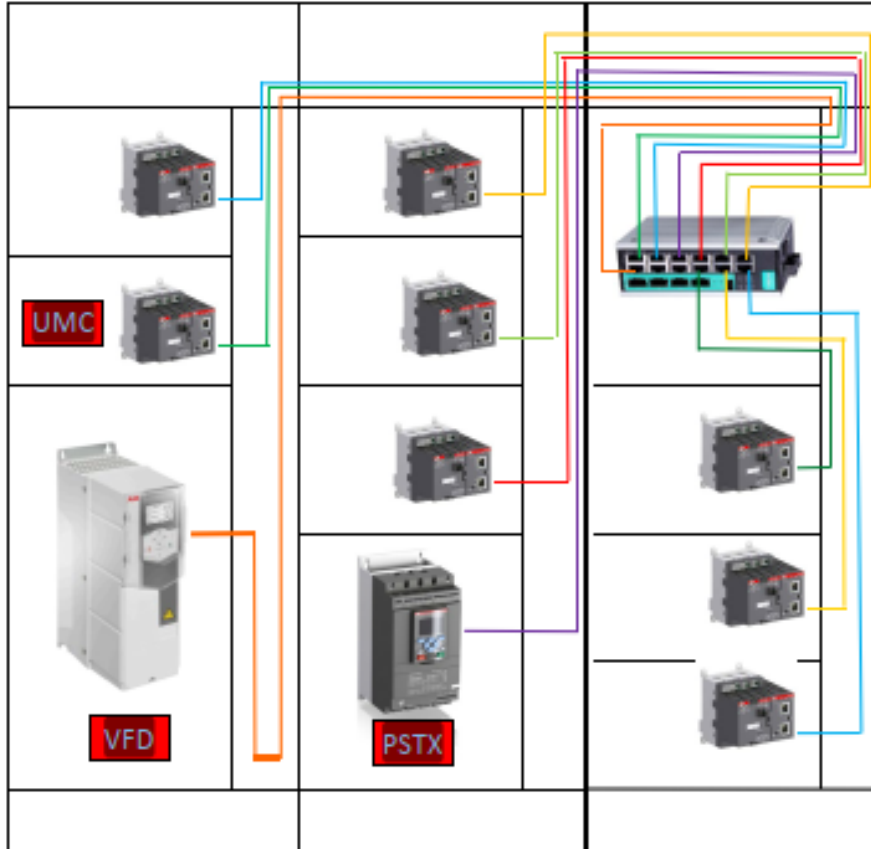
Trunk line can be top or bottom

** Need 24 V DC power supply somewhere in the network



Ethernet/IP network

Cable: Cat 5 cable



Ethernet/IP network

Cable: Cat 5 cable

Native devices available

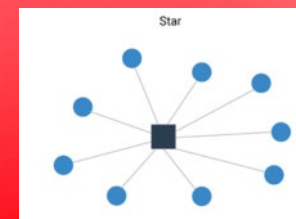
- UMC100.3
- ACS580 VFDs
- PSTX

Comms unit:

- Moxa managed switch
- DC power supply
- Fuse block

Communication topology

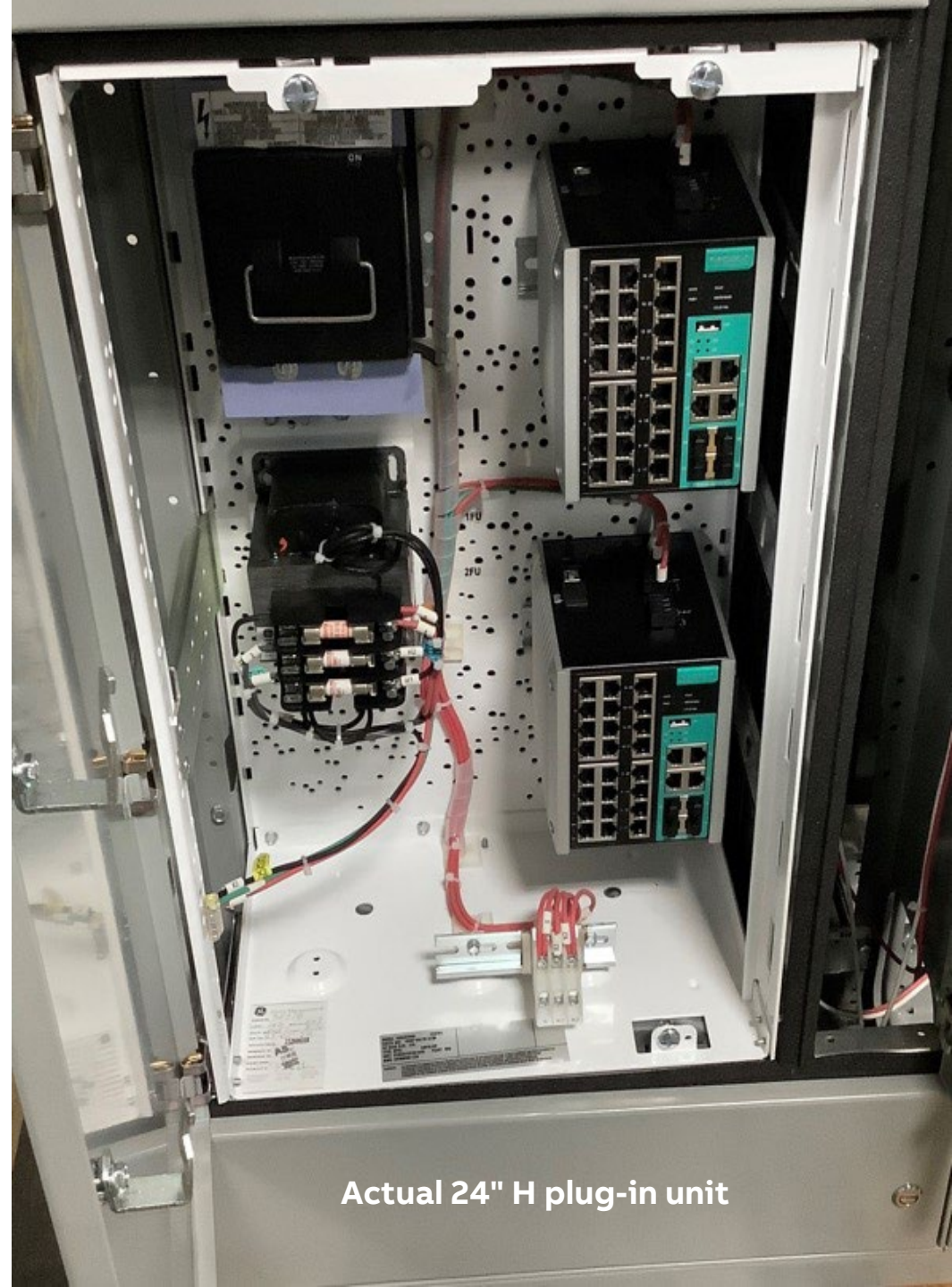
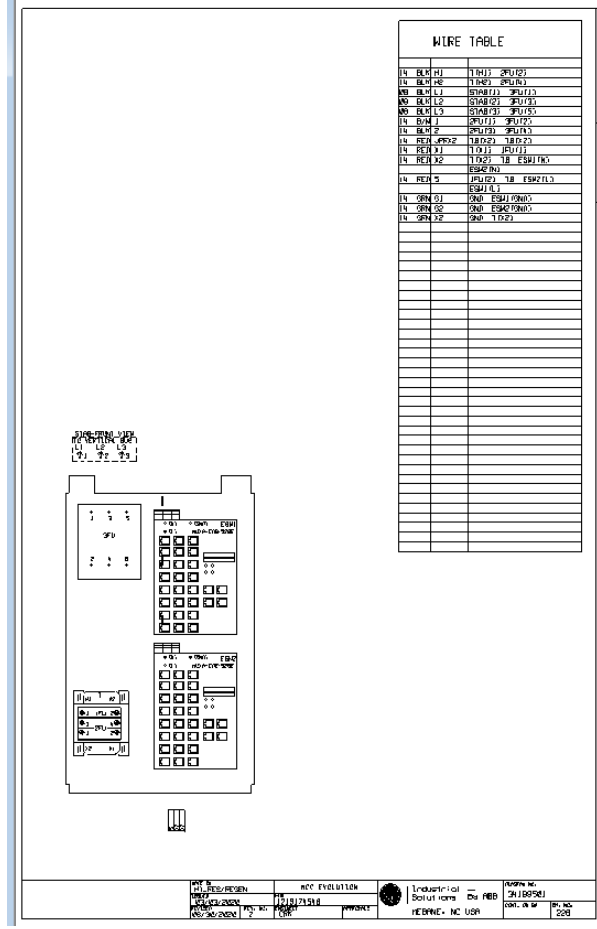
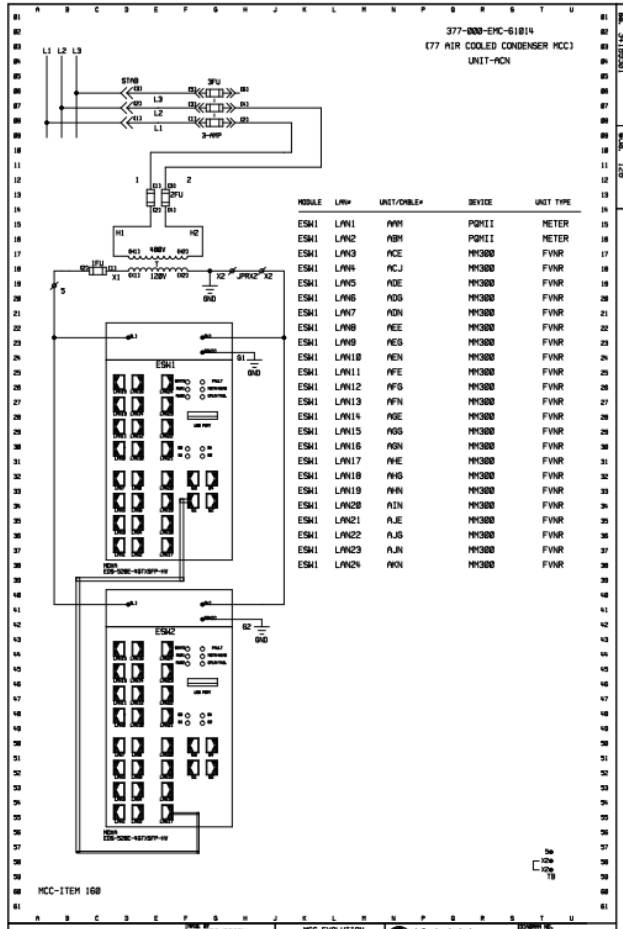
Star Chain



PDF Document

Ethernet communication unit: elem/conn/actual bucket

Control schematic and factory diagram



Actual 24" H plug-in unit

07

Softstarters

PSTX

Softstarter portfolio



PSTX

- **Soft start and stop** with linear voltage ramp and torque ramp
- Built-in **bypass** for energy savings and fast installation
- Built-in motor protection **electronic overload, current imbalance... etc.**
- **3 digital output relays, 3 digital inputs, PTC/PT100, AO, external I/O**

The softstarter offering

The one choice PSTX

Reliability

Secure motor reliability	PSR	PSRC	PSE	PSTX
Soft start and stops	●	●	●	●
Current limit	-	-	●	●
Current limit ramp and dual current limit	-	-	-	●
Electronic motor overload protection	-	-	●	●
Dual overload protection	-	-	-	●
Underload protection	-	-	●	●
Power factor underload protection	-	-	-	●
Locked rotor protection	-	-	●	●
Current/Voltage imbalance protection	-	-	-	●
Phase reversal protection	-	-	-	●
Customer defined protection	-	-	-	●
Motor heating	-	-	-	●
PTC/PT100 input for motor protection	-	-	-	●
Oversvoltage/undersvoltage protection	-	-	-	●
Earth-fault protection	-	-	-	●



Productivity

Increase application productivity	PSR	PSRC	PSE	PSTX
Torque control	-	-	●	●
Torque limit	-	-	-	●
Coated PCBA	-	-	●	●
Limp mode	-	-	-	●
Jog with slow speed forward/ reverse	-	-	-	●
Dynamic brake	-	-	-	●
Stand still brake	-	-	-	●
Sequence start	-	-	-	●
Full voltage start	-	-	-	●
Kick start	-	-	●	●
Automatic pump cleaning	-	-	-	●



Efficiency

Improve installation efficiency	PSR	PSRC	PSE	PSTX
Built-in bypass	●	●	●	●
Inside-delta connection possible	-	-	-	●
Graphical display and keypad	-	-	●	●
Detachable keypad	-	-	-	●
Motor runtime and start count	-	-	-	●
Programmable warning functions	-	-	-	●
Diagnostics	-	-	-	●
Overload time-to-trip	-	-	-	●
Overload time-to-cool	-	-	-	●
Analog output	-	-	●	●
Fieldbus communication	○	○	●	●
Event log	-	-	○	●
Multiple languages	-	-	-	17
Electricity metering	-	-	-	●



SECURE MOTOR

INCREASE APPLICATION

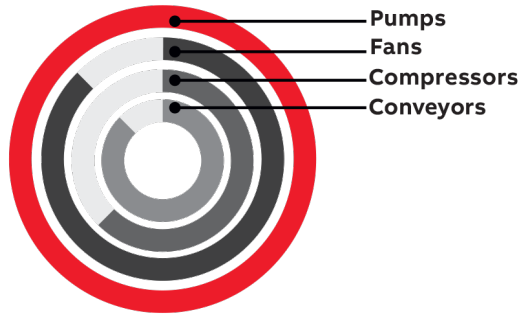
IMPROVE INSTALLATION



PSTX

Power range

- 240 V: 3 HP to 100 HP @ 100 kA
- 480 V: 7.5 HP to 500 HP @ 100 kA
- 600 V: 7.5 HP to 500 HP @ 65 kA



Keypad HMI with color indication

- Green — Ready or run
- Yellow — Protection
- Red — Faults



I/O module DX111-FBP

- External I/O module for 8 DI, 4 DO and 1 AO
- Connects to terminal 23 and 24, com 3
- New signals to be set up in menu 11: External IO



PSTX

Anybus connection for PSTX

PSTX

Anybus connection accessory for communication protocol suitable for PSTX30–PSTX570-600



PROFIBUS



DeviceNet



Modbus RTU



BACnet IP



EtherNet IP



Modbus TCP



PROFINET



BACnet MS/TP



EtherCAT



CANopen

PSTX

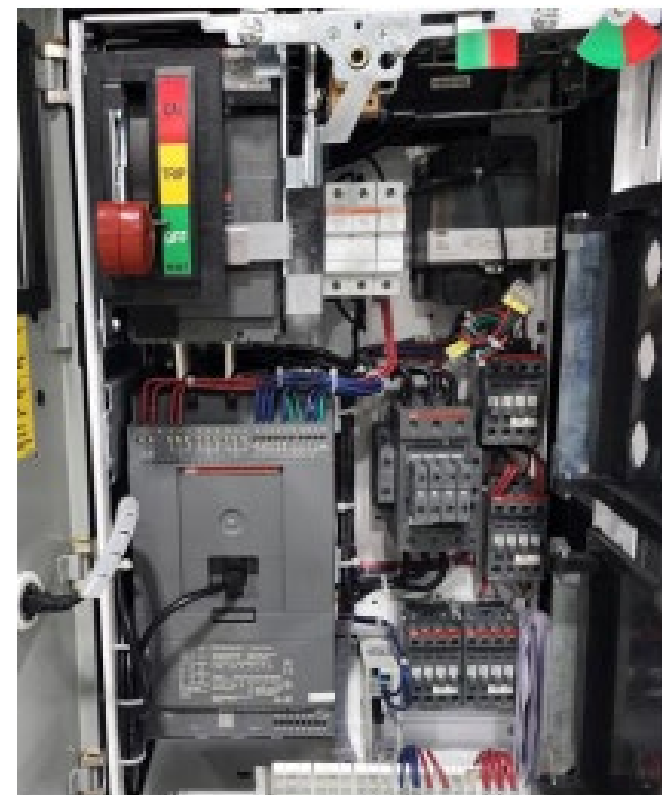
PSTX



Door-mounted keypad



Inside view



08

**Variable
Frequency Drives**

ACQ/ACS580 in ReliaGear® LV MCC

Scalable product offering

Power range

- 230 V: 0.5 HP to 75 HP
- 480 V: 0.5 HP to 500 HP
- 600 V: 0.5 HP to 200 HP

Standard features

- Standard duty and heavy duty
- Vector control for accurate and energy-efficient process control
- Safe torque off (STO) for implementing safe machinery
- 2nd gen DC choke technology mitigates harmonics (3% equivalent impedance)
- Built-in EMC filters fulfill standard C2 (1st env. public LV networks)
- Brake chopper as standard up to 30 HP
- Assistant control panel as standard
- Modbus RTU (EIA-485) as standard

Optional features

- TCI load filters up to 450 HP
- External 3% or 5% line reactor (Note: ACS580 drive includes built-in DC choke which provides a minimum 3% equivalent impedance)
- Bypass and/or isolation (bypass limited to 350 HP and 480 V/65 kAIC)
- Modbus TCP, Ethernet IP, DeviceNet, Profibus



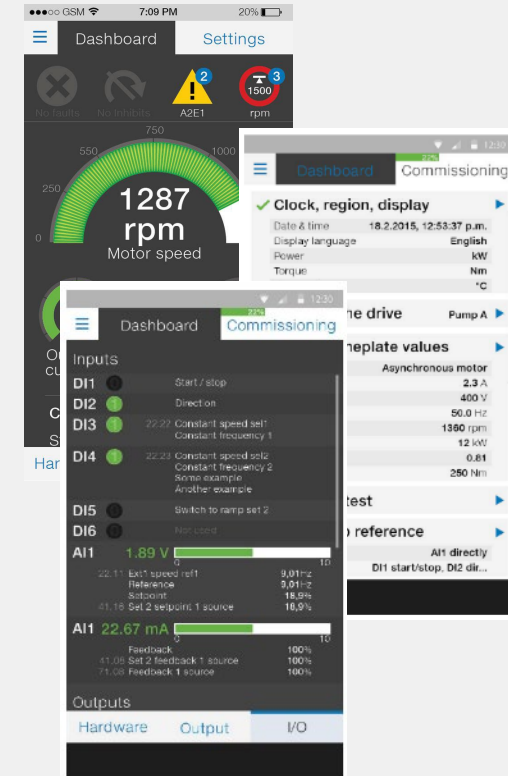
ACQ/ACS580 — ABB general purpose drives

ACS-AP-W and DriveTune

ACS580 can be equipped with **ACS-AP-W** assistant control panel with wireless Bluetooth interface.

- Order with plus code +J429

DriveTune mobile application for Android and iOS to be used in **basic commissioning** and in **troubleshooting** and **maintenance tasks**.



ACQ/ACS580 — ABB general purpose drives

Comprehensive connection points

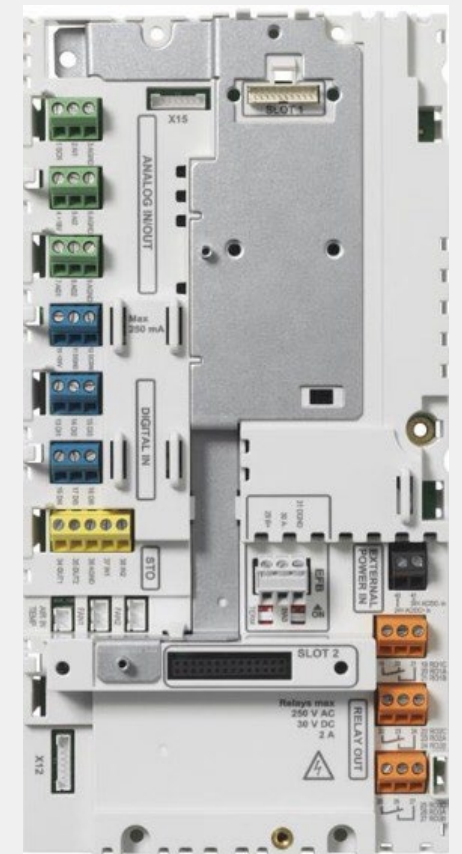
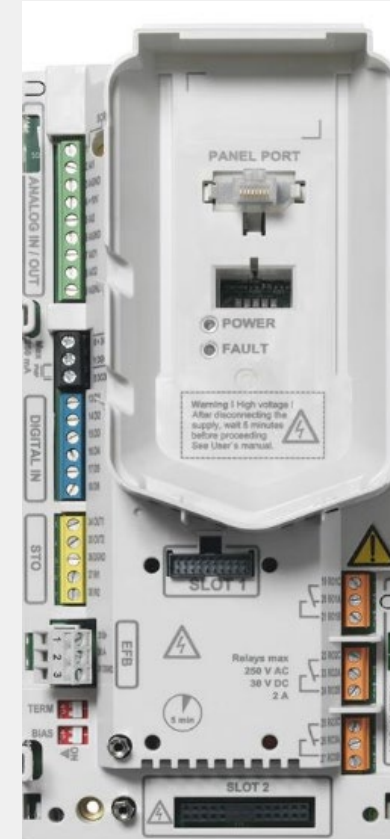
Standard features

Two different control unit versions are used in ACS580 products, CCU-23 and CCU-24.

CCU-23 is used in frames R1-R5 and CCU-24 in frames R6-R11.

Both control units have the color-coded terminals for:

- 2 analog inputs
- 2 analog outputs
- 6 digital inputs (1 pulse input)
- Safe torque off
- 3 relay outputs
- EIA-485
- Option slot 1: F-series Fieldbus adapters
- Option slot 2: I/O can be expanded with optional C-series I/O option modules



09

ATS

ATS

- 1 No 600 V offering — TruOne does not make 600 V
- 2 Only currently offering 800 A and 1200 A switches
- 3 Both sizes are 66 H x 30 W x 20 D
- 4 Both provided with 4–500 kcmil per phase
- 5 ATS is UL listed and seismic rated
- 6 Top and bottom entry
- 7 Only cable connections to ATS
- 8 For main bus connection, both left and right connection
- 9 Two controllers: Level 3 and Level 4
- 10 Scheme 1A requires dedicated feeder added to the lineup for factory to cable

Weights

800–1200 A 3-pole/4-pole: **69 lbs/82 lbs (31.1 kg/37.1 kg)**



ATS

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Weights

800–1200 A 3-pole/4-pole: **69 lbs/82 lbs (31.1 kg/37.1 kg)**



- S1 — Normal
- S2 — Emergency
- L — Load

ATS controllers

- S1 — Normal
- S2 — Emergency
- L — Load



Level 3 controls



Level 4 controls

	Level 2 controls	Level 3 controls	Level 4 controls
Source failure detections			
No voltage	Yes	Yes	Yes
Undervoltage	Yes	Yes	Yes
Overvoltage	Yes	Yes	Yes
Phase missing	Yes	Yes	Yes
Voltage unbalance	Yes	Yes	Yes
Invalid frequency	Yes	Yes	Yes
Incorrect phase sequence	Yes	Yes	Yes
Features			
Controls	DIP + keys	LCD + keys	Touch + keys
LED indications for ATS, S1 and S2 status	Yes	Yes	Yes
Open transition - Standard digital inputs/outputs	0 / 1	1 / 1	2 / 1
Delayed transition - Standard digital inputs/outputs	1 / 1	2 / 1	3 / 1
Programmable digital inputs/outputs	No	Yes	Yes
Auto config (voltage, frequency, phase system)	Yes	Yes	Yes
Source priority	Source 1, No priority	Source 1/2, No priority	Source 1/2, No priority
Manual retransfer	Yes	Yes	Yes
In-phase monitor (synchro check)	Yes	Yes	Yes
Local genset exercising: on-load, off-load	via HMI	via HMI, digital inputs	via HMI, digital inputs
Scheduled genset exercising: on-load, off-load	via Ekip Connect	via HMI, Ekip Connect	via HMI, Ekip Connect
in-built power meter module	No	No	Yes
Load shedding	No	Yes	Yes
Real time clock (48h back-up after power outage)	via Ekip Connect	via HMI, Ekip Connect	via HMI, Ekip Connect
Event log	via Ekip Connect	via HMI, Ekip Connect	via HMI, Ekip Connect
Predictive maintenance	No	No	Yes
Harmonics measuring	No	Voltage	Voltage, current
Field-mount accessories			
Auxiliary contacts for position indication	Yes	Yes	Yes
Digital input/output modules	No	Yes	Yes
12-24 Vdc aux supply module for controller	No	Yes	Yes
Communication modules	No	Yes	Yes
Connectivity			
Modbus RTU (RS-485)	No	Yes	Yes
Modbus/TCP	No	Yes	Yes
Profibus DP	No	Yes	Yes
ProfiNet	No	Yes	Yes
DeviceNet	No	Yes	Yes
Ethernet IP	No	Yes	Yes
Ekip Com Hub (monitoring via ABB Ability™: Energy and Asset Manager)	No	Yes	Yes
For applications			
Mains - Mains	Yes	Yes	Yes
Mains - Generator ¹⁾	Yes	Yes	Yes

¹⁾ Contact ABB for applications with smaller than 20 kVA gensets

10

**Resources
+ Support**

Resources and support

Contacts

Global Product Manager:

[Oscar. Moreno-Reyes@us.abb.com](mailto:Oscar.Moreno-Reyes@us.abb.com)

Mebane Proposal Manager:

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ReliaGear Product Specialist:

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Resources

ReliaGear® LV MCC

- [Technical app guide](#)
- [Installation, operation and maintenance manual](#)
- [Brochure](#)
- [Specification](#)
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