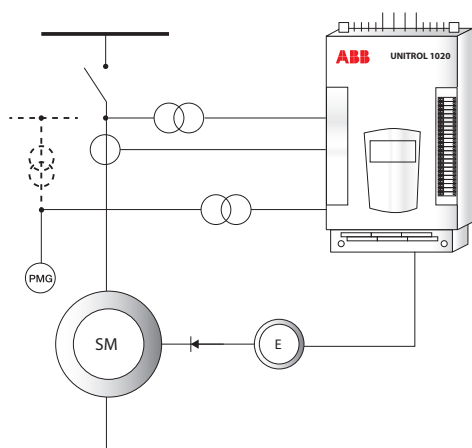
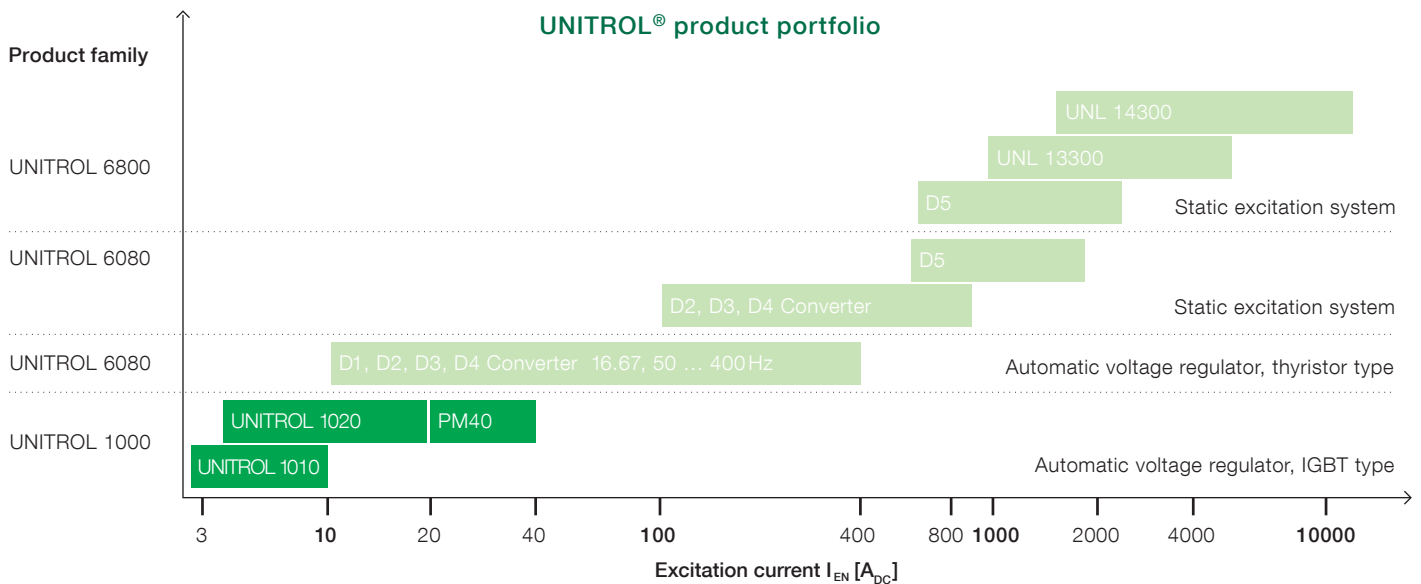


# Portfolio

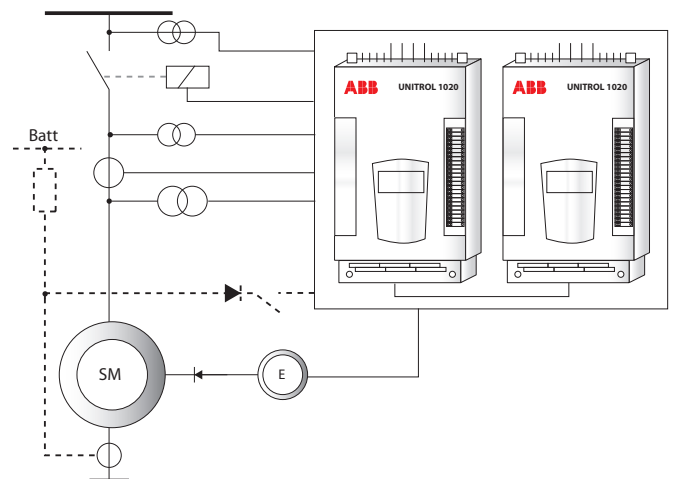
UNITROL 1020 and UNITROL 1010 are the latest products of the UNITROL 1000 family. For most reliable operation, the communication and control tasks are split in separate controllers. The non-volatile flash memory of the AVR stores events and data logs to enable fault analysis and fast trouble shooting. Time synchronization is done over Ethernet communication, and the events and data logs are time-stamped.

UNITROL 1000 is provided with modern communication ports like Ethernet and USB for connection of the PC-based commissioning tool CMT1000. Besides it is possible to power up the controller of the device via USB port. Thus the user can download files or configure the device even when no input power is available. AVR output stage is based on proven IGBT technology, which allows AC and/or DC voltage inputs from different sources.

UNITROL 1020 and UNITROL 1010 are designed for a wide range of ambient temperature and harsh environmental conditions and can be mounted directly on the machine.



Single channel generator or motor excitation with PMG supply.



Dual channel generator or motor excitation with compounding and field flashing.

# Overview

UNITROL 1020 combines high performance control and power circuits with a simple mechanical design. The construction provides a platform for a broad range of small applications, including those in highly demanding

environmental conditions. Furthermore, high levels of EMC immunity is achieved through separation of the power and measurement terminals from the I/O connectors.

## Polymer housing

Protects all live parts to prevent electric shocks.

## USB port

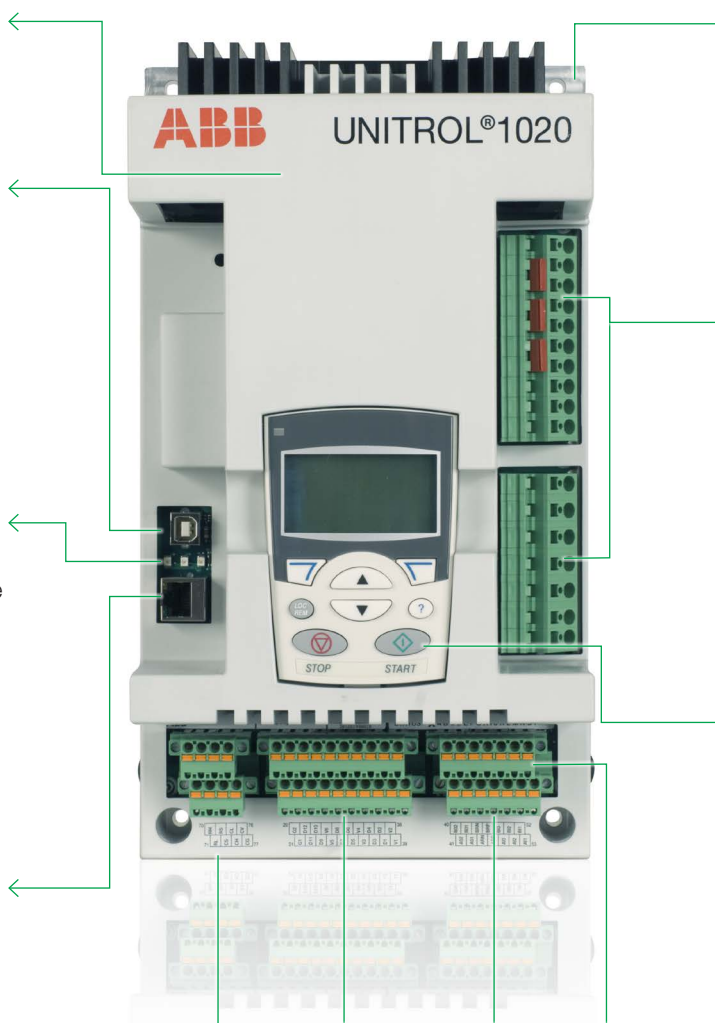
- Connects the CMT1000 (commissioning and maintenance tool)
- Device configuration and event and data upload without any other power supply

## Indication LEDs

- Green: Power ON, blinking indicates software is running
- Yellow: Excitation ON, blinking indicates limiter is active
- Red: Alarm, blinking indicates start up error

## Ethernet port

- Connects the CMT1000
- Remote access over Modbus TCP



## Solid aluminium base plate

- Robust mechanical design allows use in high vibration applications.
- Can be mounted directly within the machine terminal box.

## Power and measurement terminals

- Specified up to 30 A continuous current and max. cable up to 4 mm<sup>2</sup> (AWG 24–10)
- Tension spring terminals for reliable connection
- Easy access over test points

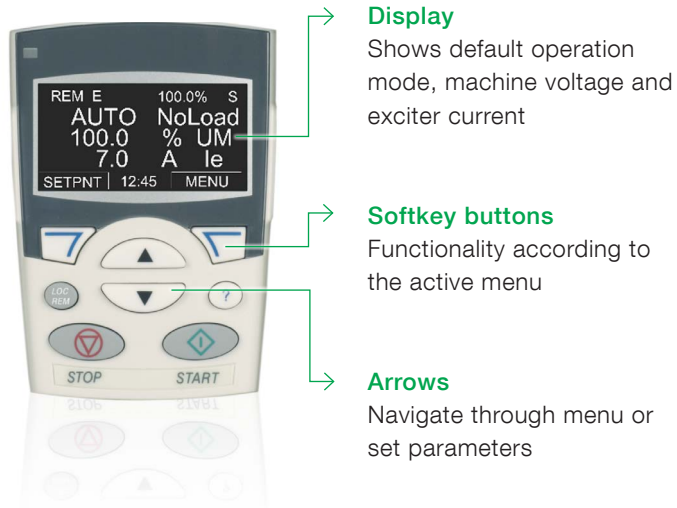
## Local human interface

- Intuitive local control panel for indication of AVR status, active limiters and measurements
- Local control can be taken over to change parameters

## Analog and digital inputs and outputs, serial fieldbus

- Tension spring connectors allow reliable wiring and fast replacement.

**Local human-machine interface provides immediate data on AVR status.**



**Display**

Shows default operation mode, machine voltage and exciter current

**Softkey buttons**

Functionality according to the active menu

**Arrows**

Navigate through menu or set parameters

The UNITROL 1000 family has freely configurable measurement and analog or digital I/Os. The configuration is done via the local human-machine interface or CMT1000 software.

**Power terminals**

- 3 phase excitation power input
- 3 phase auxiliary power input (control power supply)
- Excitation output

**Measurement terminals**

- 3 phase machine voltage
- 1 phase network voltage
- 1 phase machine current

**Analog I/O**

- 2 outputs /3 inputs (configurable)
- +10V/-10V references output

**Digital I/O**

- 4 inputs only (configurable)
- 8 inputs / outputs (configurable)
- 24 V output (600 mA) for external relay

**Serial fieldbus**

- RS485 for Modbus RTU or VDC communication
- CAN for dual channel communication

**UNITROL 1010 is a compact device with limited functionality and is designed for excitation currents up to 10A nominal. It supports the same interfaces and has the same mechanical footprint as UNITROL 1020.**



**UNITROL 1000-PM40 is the power module that extends the output current of the UNITROL 1020 up to 40A.**



# Control software

The UNITROL 1000's software has all the functions necessary for modern excitation systems. ABB offers three software-function packages out of the shelf.

## LIGHT

The **LIGHT** version covers essential functionality for cost sensitive applications where limited software functionality is required.

- Regulator control modes: Bumpless transfer between all modes
  - Automatic voltage regulator (AVR)
  - Field current regulator (FCR)
  - Power factor regulator (PF)
  - Reactive power regulator (VAR)
- Limiters: Keeping synchronous machines in a safe and stable operation area
  - Excitation current limiter (min./max.)
  - PQ minimum limiter
  - Machine current limiter
  - V/Hz limiter
  - Machine voltage limiter
- Soft start
- Voltage matching

## BASIC

The **BASIC** version covers all functionality of **LIGHT** in addition to the following:

- Modbus TCP
- Rotating diode monitoring
- Analog input to PID summing point for super imposed regulator.
- VDC mode: Reactive load sharing for up to 31 machines in island operation.
- Dual channel/monitoring: Enables the dual channel operation based on self diagnostics and setpoint follow up over CAN communication.

Available software packages:

	Software function	UNITROL 1010	UNITROL 1020
<b>LIGHT</b>	AVR/FCR/PF/VAR	LIGHT	BASIC + SYNCHRONIZATION
	Limiters		
	Soft start		
	Voltage matching		
<b>BASIC</b> (Configurable SW)	Modbus TCP	BASIC	BASIC + SYNCHRONIZATION
	Rotating diode monitoring		
	Input for closed loop control		
	VDC mode		
	Dual channel/monitoring		
<b>FULL</b> (Configurable SW)	Synchronization	FULL	FULL + PSS
	Event logger		
	Data logger		
	Real-time clock		
<b>OPTION</b>	Power system stabilizer (PSS)		

## FULL

The **FULL** version covers all functionality of **BASIC** in addition to the following:

- Synchronization: Fast and reliable built-in synchronizer.
- Event logger: Up to 500 events are stored in a non-volatile memory.
- Data logger: A data log of 12 signals is saved automatically in the non-volatile memory.
- Real-time clock: For accurate time stamped events and data logs.

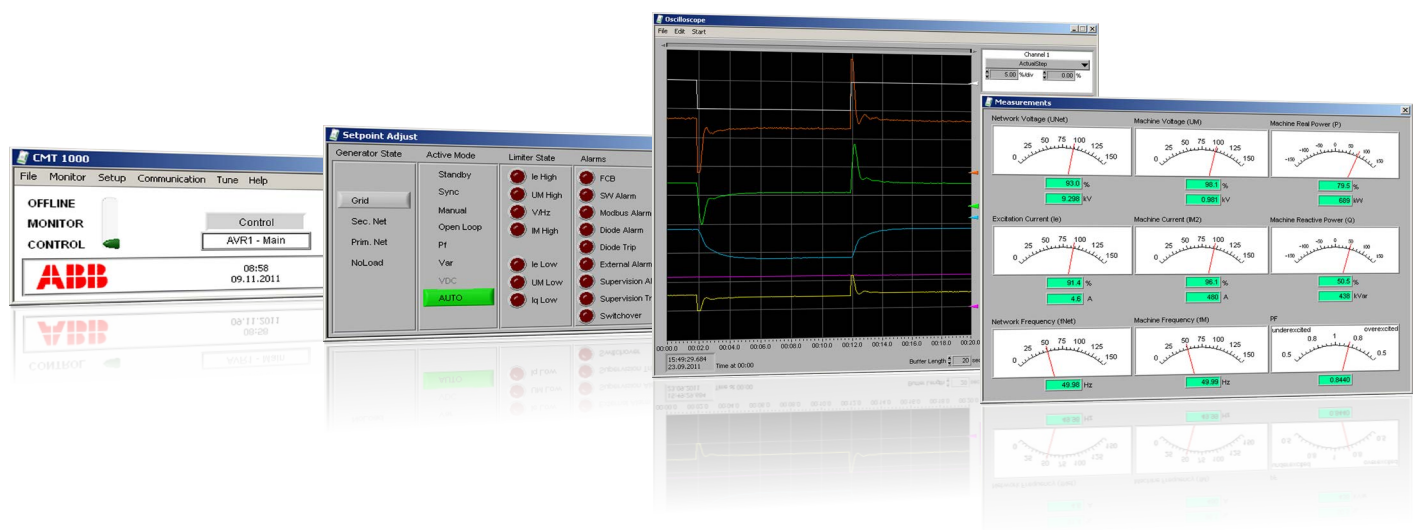
## Power system stabilizer (PSS)

The **FULL** software version can be complemented with the power system stabilizer function. Compliant with the standard IEEE 421.5-2005 2A/2B, the PSS improves the stability of the generator over the highest possible operation range.

# Commissioning and maintenance tool CMT1000

CMT1000 is a commissioning and maintenance tool for the UNITROL 1000 product family. The tool is used to setup all parameters and tune the PID to guarantee stable operation. The CMT1000 software allows an extensive supervision of the system, which helps the user to identify and locate problems during on-site commissioning.

The CMT1000 is connected to the UNITROL 1000 via USB or Ethernet port, where Ethernet connection allows remote access over 100 meters.



## Main window

- Indication of access mode and device information.
- Change of parameter is only possible in CONTROL access mode.
- LED symbol indicates that all parameters are stored on non-volatile memory.

## Setpoint adjust window

- Overview of all control modes, alarms, generator and active limiters status.
- Set point adjustment and application of steps for tuning of the PID.

## Oscilloscope

- 6 signals can be selected out of 20 recorded channels.
- The time resolution is 50 ms.
- Files can be saved to PC for further investigation.

## Measurement

- All measurements on one screen.

# Technical data and order codes

## UNITROL 1010/UNITROL 1020

### Power electronic input

AC input voltage 3-phase (max., sinusoidal)	0 to 300 V <sub>AC</sub>
DC input voltage (max.)	0 to 420 V <sub>DC</sub>
Max. peak input voltage (not sinusoidal)	420 V <sub>p</sub>

### Voltage regulation

Accuracy at 25 °C	0.2 %
AVR response time (3-phase meas.)	< 20 ms
AVR response time (1-phase meas.)	< 50 ms
PWM limitation	0.5 to 99 %

### Excitation output UNITROL 1020

Continuous output current (40 °C)	20 A <sub>DC</sub>
(55 °C requires an external capacitor)	
Continuous output current (55 °C)	15 A <sub>DC</sub>
Overload current for 10 sec. (55 °C)	40 A <sub>DC</sub>

### Excitation output UNITROL 1010

Continuous output current (55 °C)	10 A <sub>DC</sub>
Overload current for 10 sec. (55 °C)	20 A <sub>DC</sub>

### Auxiliary supply (controller) input

AC input voltage 3-phase (max., sinusoidal)	9 to 300 V <sub>AC</sub>
AC input voltage 1-phase (max., sinusoidal)	16 to 300 V <sub>AC</sub>
DC input voltage (max.)	18 to 420 V <sub>DC</sub>
Max. peak input voltage (not sinusoidal)	420 V <sub>p</sub>

### Exciter current measurements

Full range	0 to 40 A
Accuracy	< 1 %
Resolution	< 100 mA

### Measurements

Machine voltage, 1, 2 or 3 phase	up to 500 V <sub>AC</sub>
Machine current, 1 phase	1 to 5 A <sub>AX</sub>
Network voltage, 1 phase	up to 500 V <sub>AC</sub>
Frequency range	10 to 150 Hz
Accuracy	< ± 1 %

### 24 V digital I/O, 4 inputs, 8 I/Os

Digital input impedance	< 2 kΩ
Digital input threshold (low / high)	5 V / 13 V
Digital output, max. output current	150 mA

### ±10 V analog I/O, 3 inputs, 2 outputs

Analog inputs impedance	< 240 kΩ
Analog output impedance	100 Ω

### Communication interfaces

Ethernet (cable length < 100 m)	10 / 100 MBit/s
USB version (cable length < 3 m)	1.0; 1.1; 2.0
RS485 data rate (cable length < 500 m)	Configurable
CAN (cable length < 3 m)	Only for connections between UNITROL 1000 devices (UNITROL 1000-PM40 or dual channel configuration)

### Environmental data

Permissible ambient temperature	-40 to 70 °C
Maximum heat sink temperature	90 °C

### Mechanical stability

Vibration, IEC 60068-2-6	DNV class B
Shock and bump, IEC 60255-21-2	Class 2
Seismic, IEC 60255-21-3	Class 2

### EMC standards

Generic immunity standard EN 61000-6-2	
Generic emission standard IEC 61000-6-4	

### Certifications

CE certification	
cUL certifications according	
UL 508c (compliant with CSA)	
DNV certification according class B	

## UNITROL 1000-PM40

### Power electronic input

AC input voltage 3-phase (max.)	0 to 250 V <sub>AC</sub>
DC input voltage (max.)	0 to 300 V <sub>DC</sub>
Absolute max. peak input voltage	350 V <sub>p</sub>

### Excitation output UNITROL 1000-PM40

Continuous output current (55 °C)	40 A <sub>DC</sub>
Overload current for 10 sec. (55 °C)	80 A

## Order codes

### UNITROL 1010

UNITROL 1010-0002 LIGHT	3BHE035301R0002
UNITROL 1010-0003 BASIC	3BHE035301R0003
UNITROL 1010-0004 BASIC + SYNC	3BHE035301R0004

### UNITROL 1020

UNITROL 1020-0003 BASIC	3BHE030579R0003
UNITROL 1020-0004 BASIC + SYNC	3BHE030579R0004
UNITROL 1020-0006 FULL	3BHE030579R0006
UNITROL 1020-0007 FULL + PSS	3BHE030579R0007

### UNITROL 1000-PM40

UNITROL 1000-PM40	3BHE015411R0001
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Devices are shipped with a CD containing a CMT1000 commissioning and maintenance tool, a production test certificate and manuals.