MU320
Merging Unit

Analog and digital, fast and accurate:

Fully-integrated Merging Unit for Process Bus Applications

MU320 is an IEC 61850-9-2LE sampled value interface with conventional current and voltage transformers, integrating GOOSE control for switchgear

Intelligent technologies have brought many benefits in the field of transmission and distribution networks. Digital technology at the station bus level is currently widely spread, to provide a cost effective system to meet the increasing demands for higher standards in power automation. The Reason MU320 merging unit goes one step further to complete the digital substation; facilitating the connection of conventional current and voltage transformers to modern substation automation solutions through IEC 61850-9-2LE.

Benefits

Faulty protection rapid replacement: when the protective relay fails its replacement is carried out without panel rewiring.

Reduced CT windings: The Merging Unit enables that several IEDs read from the same current source.

Reduced CT size: Merging Unit has a very low burden.

Eliminates the need for supervision cables: communication is intrinsically supervised.

Increased uptime: protection can receive data from multiple Merging Units.

Less risk of opening CT circuit: signal is transmitted by messages over Ethernet network.

High accuracy Class 0.1 analog card for metering applications panels reducing drastically costs with trenches and copper cabling, for instance.

Reduced project complexity: by reducing cabling and physical connections.

In the event of communication loss, all main information is signaled via LEDs (Power, In Service, Alarm, Sync, LAN A and LAN B).

Front-end software configuration for standardized SCL file.

POWER SUPPLY

Power supply 100-250 Vdc, 110- 240 Vac	
Operating nominal voltage	100-250 V dc, 110- 240 V ac
Frequency	50/60 Hz ± 3Hz
Operating voltage range	80 - 275 V dc, 88 - 264 V ac
Power Consumption	MAX 20 VA
	Typically 14 W
Interruptions	40 ms @ 125 V a.c. / V d.c.
	100 ms @ 250 V a.c. / V d.c.
Connector	3 pin: positive (phase), negative (neutral) and ground
Power supply 24/48 Vdc	
Operating nominal voltage	24/48 Vdc
Frequency	50/60 Hz ± 3Hz
Operating voltage range	18 – 72 Vdc
Power Consumption	45 W @ 700mA
Connector	3 pin: positive (phase), negative (neutral) and ground

OPTICAL IRIG-B INPUT

Signal	IRIG-B004
Wavelength	820 nm
Fiber type	Multimode 62.5 / 125 µm
Connector	ST
	- 24 dBm
Maximum curvature ratio	30 mm
	100 ms @ 250 V a.c. / V d.c.
Connector	3 pin: positive (phase), negative (neutral) and ground

INTERNAL OSCILLATOR

Drift when not locked	±50PPM (8.64 seconds/day)

IN SERVICE CONTACT

Description	Dry contact relay, normally closed
Switching Voltage	250 V (AC and DC)
Permissible current continuous	5 A
Maximum voltage	300 (AC and DC)
Making Capacity	15 A, 4 sec
Breaking Capacity	40W Resistive, 25 W/VA L/R = 50
Dropout time	< 5 ms
Burden	~50mA @12V [600mW]
Withstand voltages across open contacts	1000V rms
Permissible short time value for 1s	30A

DIMENSIONS AND WEIGHT

Height	222 mm / 8.7 in (5 U)
Width	222 mm / 8.7 in (½ 19")
Depth	121 mm / 4.7 in
Weight	< 3.5 kg (< 7.72 lb)

ANALOG ACQUISITION

Resolution	16 bits
Acquisition rate	80 and 256 ppc
Attenuation @ 800 Hz	3 dB
Group delay	664µs

BINARY INPUTS

Nominal Voltage	125 V	250 V	24 / 48 V
Level Low	40 V	75 V	08 V
Level High	85 V	160 V	17 V
Impedance	82 kΩ	160 kΩ	15 kΩ
Burden	< 0.25 W	< 0.5 W	< 0.2 W
Continuous Overload	240 V	340 V	100 V

BINARY OUTPUTS

Description	Dry contact relay, normally open
Switching Voltage	250 V (AC and DC)
Maximum continuous current	5 A
Maximum voltage	300 (AC and DC)
Making Capacity	15 A, 4 sec
Breaking Capacity	40 W Resistive, 25 W/VA L/R = 50
Operation time / Dropout time	< 5 ms
Burden	Per energized output relay: ~50mA @12V [600mW]
Withstand voltages across open contacts	1000V rms
Permissible short time value for 1s	30A

BINARY OUTPUTS

Description	Uses IGBT technology
Rated voltage	250 V
Breaking Capacity	10A @ 250Vac with L/R= 40 ms
Make & Break, dc resistive	1368 W
Operation time	< 0.2ms
Reset time	< 8ms
Max number of operation	≥10000

OPTICAL ETHERNET PORTS

Interface	100BASE-FX
Bitrate	100 Mbps
Wavelength	1300 nm
Connector	LC
Fiber type	multimode 62.5 / 125 µm
Emission power	-20 dBm
Sensitivity	-32 dBm
Maximum applicable power	-14 dBm

VOLTAGE INPUTS

Nominal Voltage (Vn)	115 V
Nominal frequency	50/60Hz
Voltage range	0.02 ... 230 V
Accuracy	± 0.1 % F.S.
Impedance	> 210 k Ω
Burden Vn	< 0.1VA
Continuous overload	240 V
Maximum overload (1 s)	460 V (4 x Vn)
Bandwidth	3 k Hz

CURRENT INPUTS

Characteristic	Standard Input	Standard Input	High accuracy Inputs
Nominal Current (In)	5 A	1 A	1 and 5 A
Nominal frequency	50/60Hz	50/60Hz	50/60Hz
Current range (rms)	0.25 ... 200A	0.05 ... 40A	0.005... 10 A
Accuracy	± 0.1 % F.S.	± 0.1 % F.S.	Class 0.1 (IEC 61869-2) | 0,05 A to 10 A better than 0,1% of the measurement ± 1mA
Impedance	3 m Ω	15 m Ω	15 mΩ
Burden In	50 m VA	< 0.02 VA	< 0.02 VA
Continuous overload	20A (4 x In)	4A (4 x In)	10 A
AC current thermal withstand 1 s (Ith rms)	320A (64 x In)	100A (100x In)	100 A
AC current thermal withstand 10 s (Ith rms)	100A (20 x In)	30A (30 x In)	30 A
Insulation	> 3.5 kV	> 3.5 kV	>3,5 kV
Bandwidth	1 k Hz	1 k Hz	1 k Hz

TYPE TEST

EMC tests were performed according to IEC 60255-26 referring to the following standards	
IEC 61000-4-2:2008	6kV contact / 8KV air
IEC 61000-4-3:2006	10 V/m
IEC 61000-4-4:2012	2 KV @ 5KHz
IEC 61000-4-5:2005	Differential mode: 2KV Common mode: 1KV
IEC 61000-4-6:2008	10V
IEC 61000-4-8:2009	30A/m continuos - 300A/m @ 1s
IEC 61000-4-11:2004 IEC 61000-4-29:2000	- A.C. and d.c. voltage dips Test level: 0% residual voltage Duration time a.c.: 1 cycle d.c.: 16,6ms - Test level: 40% residual voltage Duration time a.c.: 12 cycles d.c.: 200ms - Test level: 70% residual voltage Duration time a.c.: 30 cycles d.c.:500ms A.C. and d.c. voltage interruptions - Test level: 0% residual voltage Duration time a.c.: 300 cycles d.c.: 5s
IEC 61000-4-16:1998	Differential mode: 100V r.m.s. Common mode: 300V r.m.s. Freq: 16,7 Hz, 50 Hz or 60 Hz
IEC 61000-4-17:1999	Test level: 15 % of rated d.c. value Test frequency: 120Hz, sinusoidal waveform
IEC 61000-4-18:2006	Voltage oscillation frequency: 1MHz Differential mode: 1kV peak voltage; Common mode 2,5kV peak voltage
Gradual Startup	Shut-down ramp: 60s Power off: 5m Start-up ramp: 60s
CISPR11:2009	Radiated emission Limits: 30 to 230MHz - 50dB(µV/m) quasi peak at 3m 230 to 1000MHz - 57dB(µV/m) quasi peak at 3m
CISPR22:2008	Radiated emission Limits: 1 to 2GHz - 56dB(µV/m) average; 76dB(µV/m) peak at 3m Limits defined considering the maximum internal frequency of 125MHz Conducted emission Limits: 0.15 to 0.50MHZ - 79dB(µV) quasi peak; 66dB(µV) average 0.5 to 30MHz - 73dB(µV) quasi peak; 60dB(µV) average
Safety tests	
Safety	IEC 60255-27
IEC 60255-5	Inpulse - 5KV Dielectric withstand - 3,3KVDC Insulation > 100M Ω
Environmental tests	
IEC 60068-2-1	-40°C, 16 hours (Cold)
IEC 60068-2-2	+85°C, 16 hours (Dry heat)
IEC 60068-2-30	95% no condensation, 55°C (Damp heat)
IEC 60068-2-14	-40°C to 85°C / 9 hours / 2 cycles (Change of temperature)
IEC 60255-21-1	Class 2 (Vibration)
IEC 60255-21-2	Class 1 (Shock)

OPTICAL ETHERNET PORTS

Optical Ethernet ports specifications	
Operating temperature range	-40 °C (-40 °F) ... +55°C (+131°F)
Tested as per IEC 60068-2-1:2013	–40°C (–40°F)
Tested as per IEC 60068-2-2:2013	+85°C (+185°F)
Relative humidity	0 ... 95 %, noncondensing
Enclosure Protection IEC 60529	
Front flush mounted with panel	IP54
Rear and sides	IP20
Product safety protection	IP10 (for the rear due to live Connections on the terminal block)

GE Grid Solutions

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MU320_DS_EN_V03