POWER SUPPLY 1-PHASE, 24 V DC DIMENSION Q SERIES

QS10.241-A1 PSU 100-240V ac I/P 24V dc 10A 240W O/P ATEX

- Power supply unit for DIN rail. 100-240 V ac/110 V dc
- 60/82 mm wide
- Up to 93.9% efficiency
- 50% bonus power
- Maximum performance





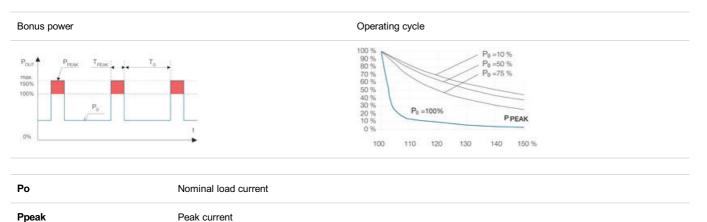
PRODUCT DESCRIPTION

Puls Dimension Q is a new generation of power supply unit with very small construction dimensions and many technical benefits. The power supply unit has low inrush current (even with warm starts), active PFC, which provides a power factor close to one, expanded temperature range and active protection against line transients. (Not QS20) The power supply unit has high efficiency, which provides long lifetime both for the unit and adjacent products. Temperature increases in the cabinet are also kept at a low level. Furthermore, there is a relay output (DC OK) that is deactivated when the output voltage deviates more than 10 % from the set value. The bonus power provides an extra 50 % reserve with retained 24 V, which is an advantage when connected loads have high starting currents. The power supply unit has a high short-circuit current that simplifies tripping of secondary fuses. Both the bonus power and short-circuit current are time-limited to 4 seconds to avoid constant overloading of the power supply unit and wiring. QS20.241 If a short circuit lasts longer than 4 seconds, the power supply unit will continue in so-called hick-up mode. The output power is reduced to nearly zero for about 17 seconds. The power supply unit then makes a new start-up attempt for 2-4 seconds. If the short circuit remains, a new pause of 17 seconds is taken. Once the short circuit is remedied, the power supply unit automatically returns to service. For more technical information, consult the general information at the beginning of the power supply section.

Bonus power

То

The power supply unit has bonus power that enables high power extraction with retained 24 V DC for 4 seconds, which is a major advantage when connected loads have high starting currents, such as the case with motors. How often bonus power can be utilised depends on the application. With the following diagram and formula, the repeat time can be calculated for each application. The bonus power is available as soon as the power supply unit is started and directly after a short circuit.



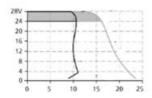
Time between bonus power

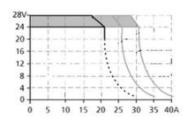
Tpeak	Peak current I time
Operating cycle	Tpeak / (Tpeak + To)
То	Tpeak - (operating cycle * Tpeak) / operating cycle

Example: Nominal load current (Po) is 7.5 A. Peak current (Ppeak) is 12 A

20 % of I_{nom} . The peak time is 3 seconds. 7.5 A = 75 % of I_{nom} . According to the diagram, the operating cycle is about 50 %. To = 3- (0.5 * 3) / 0.5 = 3 Maximum repeat time of the power boost is 3 seconds

Output characteristics





QS10.241 QS20.241

TECHNICAL DATA

INPUT DATA

Input voltage ac	100-240 V
Input voltage ac min	85 V AC
Input voltage ac max	276 V AC
Input voltage dc	110-150 V
Input voltage dc min	88 V DC
Input voltage dc max	187 V DC
Inrush current at 120 V ac typical	4 A
Inrush current at 230 V ac typical	7 A
Input voltage range	Wide-range
Power factor at 120 V ac, full load. Typical	0,98
Power factor at 230 V ac, full load. Typical	0,92
Number of phases	1

OUTPUT DATA

Output voltage	24 V DC
Output voltage min	24 V DC

Efficiency at 120 V ac, full load, typical Efficiency at 230 V ac, typical Efficiency at 230 V ac, full load, typical Lifetime at 120 V ac, full load and +40 ° C Efficiency at 230 V ac, full load and +40 ° C Tifetime at 230 V ac, full load and +40 ° C Tifetime at 230 V ac, full load and +40 ° C Tifetime at 230 V ac, max load, 40 ° C Efficiency at 230 V ac, full load and +40 ° C Tifetime at 230 V ac, full load and +40 ° C Tifetime at 230 V ac, full load and +40 ° C Efficiency at 230 V ac, typical Efficiency at 230 V ac, typical 92,6 % 68000 h Lifetime at 120 V ac, full load, typical 93,5 % Efficiency at 230 V ac, typical 93,5 % 68000 h Efficiency at 230 V ac, typical 93,5 % Efficiency at 230 V ac, typical 93,5 % 68000 h Efficiency at 230 V ac, typical 93,5 % Efficiency at 230 V ac, typical 93,5 % 68000 h Efficiency at 230 V ac, typical 93,5 % Efficiency at 230 V ac, typical 100 h Efficiency at 230 V				
Power 240 W EFFICIENCY / LIFETIME / MTBF Efficiency at 120 V ac, full load, typical 92.6 % Efficiency at 230 V ac, typical 92.4 % Efficiency at 230 V ac, full load, typical 93.5 % Lifetime at 120 V ac, full load and +40 ° C 68000 h Lifetime at 230 V ac, full load and +40 ° C 71000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 71000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 71000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 71000 h MIDDAMENSIONS Width 60 mm Height 17 mm Depth 17 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class 1P class 1P20 Clamp type Spring-clamp Material protection Aluminum Supply frequency 80.60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power consumption 230 V ac 1,22 A Power drop from +60 °C to + 70 °C 6W/°C Temperature min without derating 25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Output voltage max	28 V DC		
EFFICIENCY / LIFETIME / MTBF Efficiency at 120 V ac, full load, typical 92,6 % Efficiency at 230 V ac, typical 92,4 % Efficiency at 230 V ac, full load and +40 ° C 68000 h Lifetime at 120 V ac, full load and +40 ° C 71000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 881000 h DIMENSIONS Width 60 mm Height 124 mm Depth 117 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEx, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP2 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 122 A Power consumption 120 V ac 125 ° C Temperature min without derating 60 ° C Type Power Supply AC-DIC Type Power Supply AC-DIC Type Power Supply AC-DIC Type Power Supply AC-DIC ### AC-DIC	Output current	10 A		
Efficiency at 230 V ac, typical 92,6 % Efficiency at 230 V ac, typical 92,4 % Efficiency at 230 V ac, full load, typical 93,5 % Lifetime at 120 V ac, full load and +40 ° C 71000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 551000 h DIMENSIONS Width 60 mm Height 124 mm Depth 117 mm Woight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 22 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-damp Material protection Aluminium Supply frequency 50-60 ±6 % Ripole max 50 W pp Series Dimension Q Power consumption 120 V ac 122 A Power drop from +60 °C to + 70 °C 6 W °C Temperature max without derating 15 c	Power	240 W		
Efficiency at 230 V ac, typical 92,4 % Efficiency at 230 V ac, full load, typical 93,5 % Lifetime at 120 V ac, full load and +40 ° C 68000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C 581000 h DIMENSIONS Wridth 60 mm Height 124 mm Depth 117 mm Weight 0,9 kg OTHER Approvals Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-0 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power drop from +60 °C to +70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C	EFFICIENCY / LIFETIME / MTBF			
Efficiency at 230 V ac, full load and +40 ° C Lifetime at 230 V ac, full load and +40 ° C MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C Temperature min without derating Type Power Supply MCD C S81000 h S81000 h S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h S81000 h S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C S81000 h S81000 h MTBF (IEC 61709) 230 V ac, max load, 40 ° C Temperature min without derating Type Power Supply MCD C S81000 h S810	Efficiency at 120 V ac, full load, typical	92,6 %		
Lifetime at 120 V ac, full load and +40 ° C 68000 h Lifetime at 230 V ac, full load and +40 ° C 71000 h MITBF (IEC 61709) 230 V ac, max load, 40 ° C 581000 h DIMENSIONS Width 60 mm Height 124 mm Depth University Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 Å Power consumption 230 V ac 1,22 Å Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating AC-DC	Efficiency at 230 V ac, typical	92,4 %		
Lifetime at 230 V ac, full load and +40 ° C 71000 h MITER (IEC 61709) 230 V ac, max load, 40 ° C 581000 h DIMENSIONS Width 60 mm Height 124 mm Depth 117 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60-26 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power consumption 230 V ac 1,22 A Power drop from +60 °C to +70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating -25 °C Type Power Supply AC-DC	Efficiency at 230 V ac, full load, typical	93,5 %		
MTBF (IEC 61709) 230 V ac, max load, 40 ° C 581000 h DIMENSIONS Width 60 mm Height 124 mm Depth 117 mm Weight 0.9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60-66-66 Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to +70 °C 6 W//°C Temperature min without derating -25 °C Temperature max without derating -25 °C Type Power Supply AC-DC	Lifetime at 120 V ac, full load and +40 ° C	68000 h		
Width 60 mm Height 124 mm Depth 117 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power drop from +60 °C to +70 °C 6 W/°C Temperature min without derating 50 °C Type Power Supply AC-DC Type Power Supply AC-DC	Lifetime at 230 V ac, full load and +40 ° C	71000 h		
Width 60 mm Height 124 mm Depth 117 mm Weight 0.9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	MTBF (IEC 61709) 230 V ac, max load, 40 ° C	581000 h		
Height 124 mm Pepth 117 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	DIMENSIONS			
Depth 117 mm Weight 0,9 kg OTHER Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 1P20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to + 70 °C 6 W''C Temperature min without derating -25 °C Temperature max without derating AC-DC Type Power Supply AC-DC Temperature max without derating AC-DC Temperature max without derating AC-DC Temperature Supply AC-DC Tempera	Width	60 mm		
Weight OTHER Approvals Approvals Hold time at 120 V ac, typical full load P class IP class IP class IP class IP clamp type Material protection Aluminium Supply frequency Ripple max So mV pp Series Dimension Q Power consumption 120 V ac Power drop from +60 °C to +70 °C Temperature min without derating Temperature max without derating Temperature max without derating Type Power Supply ABS, ATEX, CB, CE, CSA, GL, IECEX, UL ABS, ATEX, CB, CE, CSA,	Height	124 mm		
Approvals Approvals Approvals Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power drop from +60 °C to + 70 °C Temperature min without derating Type Power Supply AC-DC Type Power Supply AC-DC Ams Abs, ATEX, CB, CE, CSA, GL, IECEx, UL Abs, ATEX, CB, CE, CSA, GL, IECEx, UL In Company In Comp	Depth	117 mm		
Approvals ABS, ATEX, CB, CE, CSA, GL, IECEX, UL Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP 20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to +70 °C Temperature min without derating Type Power Supply AC-DC ABS, ATEX, CB, CE, CSA, GL, IECEX, UL ABS, ATEX, CB, CS, CS, CS, CS, CS, CS, CS, CS, CS, CS	Weight	0,9 kg		
Hold time at 120 V ac, typical full load 27 ms Hold time at 230 V ac, typical full load 28 ms IP class IP20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W °C Temperature min without derating -25 °C Temperature max without derating AC-DC	OTHER			
Hold time at 230 V ac, typical full load IP class IP 20 Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to +70 °C Temperature min without derating 60 °C Type Power Supply AC-DC	Approvals	ABS, ATEX, CB, CE, CSA, GL, IECEx, UL		
IP class Clamp type Spring-clamp Material protection Aluminium Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to +70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating AC-DC AC-DC	Hold time at 120 V ac, typical full load	27 ms		
Clamp typeSpring-clampMaterial protectionAluminiumSupply frequency50-60 ±6 %Ripple max50 mV ppSeriesDimension QPower consumption 120 V ac2,22 APower consumption 230 V ac1,22 APower drop from +60 °C to + 70 °C6 W/°CTemperature min without derating-25 °CTemperature max without deratingAC-DC	Hold time at 230 V ac, typical full load	28 ms		
Material protection Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating AC-DC	IP class	IP20		
Supply frequency 50-60 ±6 % Ripple max 50 mV pp Series Dimension Q Power consumption 120 V ac 2,22 A Power consumption 230 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W/° C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Clamp type	Spring-clamp		
Ripple max 50 mV pp Dimension Q Power consumption 120 V ac 2,22 A Power drop from +60 °C to + 70 °C Temperature min without derating Type Power Supply 50 mV pp Dimension Q 2,22 A 6 W/°C 6 W/°C Temperature max without derating AC-DC	Material protection	Aluminium		
Series Dimension Q Power consumption 120 V ac 2,22 A Power consumption 230 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Supply frequency	50-60 ±6 %		
Power consumption 120 V ac 2,22 A Power consumption 230 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Ripple max	50 mV pp		
Power consumption 230 V ac 1,22 A Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Series	Dimension Q		
Power drop from +60 °C to + 70 °C 6 W/°C Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Power consumption 120 V ac	2,22 A		
Temperature min without derating -25 °C Temperature max without derating 60 °C Type Power Supply AC-DC	Power consumption 230 V ac	1,22 A		
Temperature max without derating 60 °C Type Power Supply AC-DC	Power drop from +60 °C to + 70 °C	6 W/°C		
Type Power Supply AC-DC	Temperature min without derating	-25 °C		
	Temperature max without derating	60 °C		
Conformal coated Yes	Type Power Supply	AC-DC		
	Conformal coated	Yes		

Active Transient

Yes

Fig. 6-1 Output voltage vs. output current,

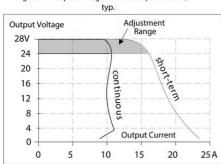


Fig. 15-1 Output current vs. ambient temp.

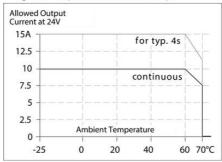


Fig. 9-2 Losses vs. output current at 24V, typ.

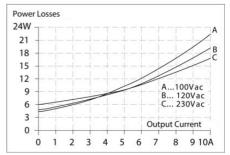


Fig. 9-1 Efficiency vs. output current at 24V, typ

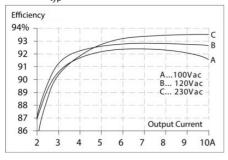
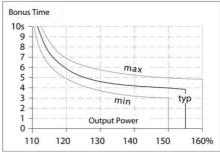


Fig. 6-2 Bonus time vs. output power



 Maximal wire length
 *) for a fast (magnetic) tripping:

 0.75mm²
 1.0mm²
 1.5mm²
 2.5mm²

	0.750000	1.0111111	1.2111111	2.3111111
C-2A	23m	29m	48m	69m
C-3A	20m	24m	38m	57m
C-4A	12m	16m	22m	33m
C-6A	5m	7m	9m	14m
C-8A	3m	4m	5m	7m
C-10A	2m	3m	4m	6m
C-13A	1m	1m	2m	2m
B-6A	11m	14m	24m	34m
B-10A	5m	8m	11m	18m
B-13A	4m	6m	8m	10m

*) Don't forget to consider twice the distance to the load (or cable length) when calculating the total wire length (+ and – wire).



