



ACS System Solutions "Mobile Lab"

Standardized multi-device systems for the ACS family

The ACS standard systems offer high-quality integration of REGATRON's versatile programmable regenerative AC power supply "ACS" for mobile laboratory applications. These systems are all on castors and available in a liquid-cooled or air-cooled variant for maximal flexibility. This document describes plug-and-play systems in the range of 30...100 kVA, which are scalable to higher levels through a multi-system configuration. The systems include a lockable main circuit breaker, the entire mains distribution, auxiliary supply, and emergency stop integration with performance level e (PL e) following EN ISO 13849.

Modular and Easily Scalable Systems

The output of a power supply system can be set up from 0...30 kVA up to 0...2000+ kVA. The advantageous modularity of REGATRON power supply solutions allows the system to be easily adapted to ever-changing test requirements. Furthermore, the system can be expanded with additional power supply units or may be split into smaller units. The mixed operation of 30 kVA and 50 kVA power supply units allows various power requirements to be met. Therefore, purchasing a REGATRON power supply is a solid investment for the future.

In addition to the standardized systems, REGATRON also offers turn-key cabinet solutions and project-specific system integration according to customer specifications, whether for single units or powerful multi-device systems.

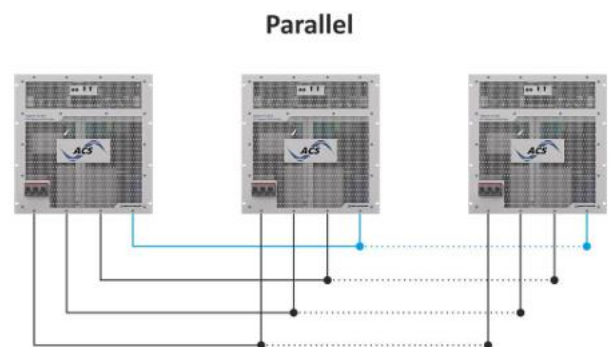


Figure 1: Modular concept for easy power increase by parallel operation. Mixed operation of 30 kVA and 50 kVA power units within same system is also possible.

Overview of ACS Standard Systems "Mobile Lab":

The standard systems from 30...100 kVA listed below are designed on the following base units:

- ACS.30.528.4WR.S.LC with 30 kVA / 528 V / 43 A
- ACS.50.528.4WR.S.LC with 50 kVA / 528 V / 72 A

For maximal flexibility, systems with two ACS devices can be used in parallel for an increased power output or as two independent devices, if the devices are ordered accordingly. The systems are available in both air-cooled and liquid-cooled versions. The air-cooled systems use the LAE (liquid-to-air heat exchanger) unit:

- LAE.5.400

30 kVA Systems

Order Code	Power kVA	Current A	Base Unit kVA.V.A *	Cooling
SYS.30.528.43.A	30	43	30.528.43	Air
SYS.30.528.43.L	30	43	30.528.43	Liquid

50 kVA Systems

Order Code	Power kVA	Current A	Base Unit kVA.V.A *	Cooling
SYS.50.528.72.A	50	72	50.528.72	Air
SYS.50.528.72.L	50	72	50.528.72	Liquid

60 kVA Systems

Order Code	Power kVA	Current A	Base Unit kVA.V.A *	Cooling
SYS.60.528.86.A	60	86	30.528.43	Air
SYS.60.528.86.L	60	86	30.528.43	Liquid

80 kVA Systems

Order Code	Power kVA	Current A	Base Unit kVA.V.A *	Cooling
SYS.80.528.115.A	80	115	30.528.43 50.528.72	Air
SYS.80.528.115.L	80	115	30.528.43 50.528.72	Liquid

100 kVA Systems

Order Code	Power kVA	Current A	Base Unit kVA.V.A *	Cooling
SYS.100.528.144.A	100	144	50.528.72	Air
SYS.100.528.144.L	100	144	50.528.72	Liquid

(*) all current and voltage values are given as RMS values (L-L).



Figure 2: The 30 kVA and 50 kVA systems with one ACS device in a liquid-cooled (left) and an air-cooled (right) variant.



Figure 3: The 60 kVA, 80 kVA, and 100 kVA systems with two ACS devices in a liquid-cooled (left) and an air-cooled (right) variant.

Technical Data

Case

All systems are designed with IP20 protection and a lockable rear door. Cables are routed into the enclosure via a cable brush on the rear or the open bottom of the enclosure.

- The systems are provided with castors, 360 degrees rotatable, and two of them with brakes
- Coating in RAL 7035
- Locking set EK 333 for the rear door

Air Cooled Systems

Order Code	Dimensions H × W × D in mm H × W × D in "	Weight kg lbs	Nominal Input Current A (AC)
SYS.30.*.A	1335 × 650 × 1000 52.6 × 25.6 × 39.4	410 900	63
SYS.50.*.A	1335 × 650 × 1000 52.6 × 25.6 × 39.4	410 900	100
SYS.60.*.A	1935 × 650 × 1000 76.2 × 25.6 × 39.4	620 1370	125
SYS.80.*.A	1935 × 650 × 1000 76.2 × 25.6 × 39.4	620 1370	160
SYS.100.*.A	1935 × 650 × 1000 76.2 × 25.6 × 39.4	620 1370	200

Liquid Cooled Systems

Order Code	Dimensions H × W × D in mm H × W × D in "	Weight kg lbs	Nominal Input Current A (AC)
SYS.30.*.L	1335 × 650 × 1000 52.6 × 25.6 × 39.4	390 860	63
SYS.50.*.L	1335 × 650 × 1000 52.6 × 25.6 × 39.4	390 860	100
SYS.60.*.L	1735 × 650 × 1000 68.3 × 25.6 × 39.4	560 1230	125
SYS.80.*.L	1735 × 650 × 1000 68.3 × 25.6 × 39.4	560 1230	160
SYS.100.*.L	1735 × 650 × 1000 68.3 × 25.6 × 39.4	560 1230	200

Dimensions are meant without the option "AC Cable" and weight as an upper limit. The exact weight is stated on the system plate.

Air Cooling

Air-cooled systems do not require an additional connection for the cooling, since the LAE unit provides a closed fluid circulation. The maximum power level depends on the ambient temperature:

Temp.	SYS.30.*	SYS.50.*	SYS.60.*	SYS.80.*	SYS.100.*
40 °C	30 kVA	35 kVA	60 kVA	65 kVA	70 kVA
35 °C	30 kVA	45 kVA	60 kVA	75 kVA	90 kVA
32 °C	30 kVA	50 kVA	60 kVA	80 kVA	100 kVA

Liquid Cooling

Liquid-cooled systems require a fluid circulation system that meets the following specifications:

Systems	SYS.30.*.L SYS.50.*.L	SYS.60.*.L SYS.80.*.L SYS.100.*.L
Inlet/outlet size	G ½" Incl. tap connectors G ½" to 13 mm ø	G ¾" Incl. tap connectors G ¾" to 19 mm ø
Liquid temperature	15...50 °C	15...50 °C
Flow rate	2.5 l/min (25 °C) – 8.0 l/min (50 °C)	8 l/min (25 °C) – 25 l/min (50 °C)
operation pressure	≤4 bar	≤4 bar

Grid Connection

The wide-band AC input accepts all common three-phase AC grid systems and has an active power factor correction.

- 380...480 VAC ±10% at 50/60 Hz
- 3L + PE connection on power cage clamps.
- 3-fold lockable mains circuit breaker
- Additional circuit breaker 2L/10 A for optional LAE liquid to air heat exchanger and 24 V_{DC} auxiliary supply for the control circuit
- Designed for operation in Lightning Protection Zone 1 (LPZ1)

Load Connection

The connection of the load is done by power cage clamps. They are suitable for conductors up to 95 mm² (AWG 4/0) and offer two jumper slots for convenient changing between parallel and single device configurations.

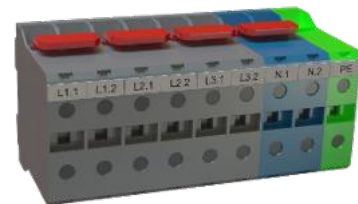


Figure 4: Jumper slots allow for connecting or separating the outputs of the individual ACS devices.

Safety

The integrated emergency stop circuit ensures a safe cut-off of the energy flow from the mains side to the load side and vice versa. It can be triggered by the integrated emergency stop button or via interfaces to the superordinate laboratory emergency stop circuit. The available interfaces and optional safety bus cables (SAFBUS) allow for easy interconnection of up to three systems in the same safety circuit.

- Emergency stop button red/yellow, 2-channel
- Category 3, performance level e (PL e) following DIN EN ISO 13849-2:2012
- The safety circuit requires the ACS's integrated safety relay feature (ISR)
- 1x Safety I/O (D-SUB 25) and 2x P-Stop (D-SUB 9) interfaces are available for external integration or multi-system configuration
- Dummy plugs for stand-alone operation included in the scope of delivery

The safety I/O interface provides potential-free contacts to trip the higher-level safety circuit as soon as the internal emergency stop of the ACS system is triggered. The interface also features cross-circuit monitored contacts to stop the ACS system by external emergency stop equipment. Furthermore, control and diagnostics of the read-back circuit, AUTO/MANUAL reset function, and status indications are provided.

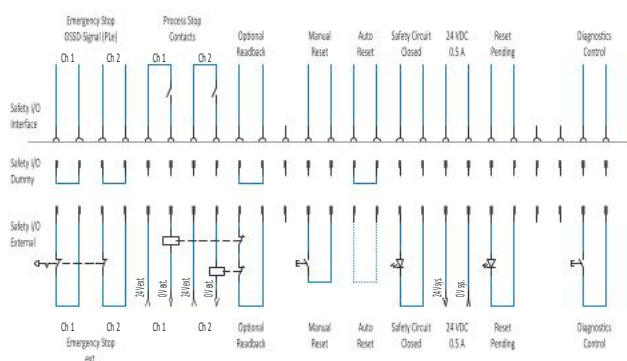


Figure 5: Overview of the safety I/O interface.

The two process stop interfaces can be integrated into the higher-level safety circuit similarly to the safety I/O interface. The advantage of this interface is that the external switch-off only affects the output stages and not the ACS safety circuit. This means the higher-level system can still be activated via potential-free contacts regardless of the external switch-off, which helps to avoid possible deadlocks. These interfaces are used for the interconnection of up to three systems.

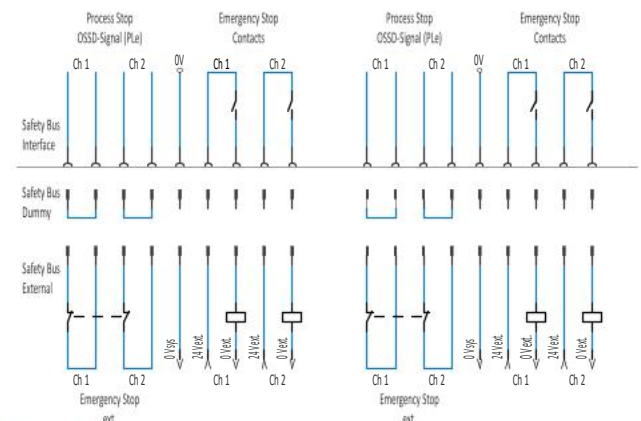


Figure 6: Overview of the two process stop interfaces.

Environmental Conditions, Regulations, and Documentation

- Operating temperatures:

System power	Cooling	Operating Temp.
30 kVA	Liquid	5...40 °C
30 kVA	Air	5...40 °C
50 kVA	Liquid	5...40 °C
50 kVA	Air	5...32 °C
60 kVA	Liquid	5...40 °C
60 kVA	Air	5...40 °C
80 kVA	Liquid	5...40 °C
80 kVA	Air	5...32 °C
100 kVA	Liquid	5...40 °C
100 kVA	Air	5...32 °C
- Relative humidity: ≤95%, non-condensing
- Cooling: air (direct forced, front to back) or liquid
- CE conformity and design according to EN 61439-2
- User manual in English as default
- Wiring diagram in English as default

Options

Safety Bus Cable (SAFBUS)

When increasing the power ratings with multiple systems, up to three of them can be integrated into the same safety circuit. In a configuration with two systems, the systems are connected with one safety bus cable (SAFBUS) on a P-Stop interface. For a triple combination, three safety bus cables are required and connected to both P-Stop interfaces of each system in a triangle connection.

CASE.ACS.COM.KIT.3

When combining multiple systems, this option is required to ensure proper signal transmission and earthing between the systems. The option includes:

- Grounding straps
- Ferrite ring core
- EMC shield clamp
- Communication cables 3 m (1 × blue, 1 × green)

AC Cable (INACC.CEE63.400.5)

- AC cable, 5 m with 3L + PE, 10 mm² / AWG7
- CEE63 connector 5-pole for 63 A / 400 VAC ±10% for SYS.30.*
- Cable inlet on the left
- Including cable roll-up support, cabinet width increased to 765 mm / 30.1"
- Discharging of the ACS's AC filter (XCD) is mandatory when using the system with a plug connection. The XCD option ensures a discharge time of the AC filter of <1 s as required by EN 62477-1

AC Cable (INACC.CEE125.400.5)

- AC cable, 5 m with 3L + PE, 25 mm² / AWG3
- CEE125 connector 5-pole for 125 A / 400 VAC ±10% for SYS.50.*
- Cable inlet on the left
- Including cable roll-up support, cabinet width increased to 765 mm / 30.1"
- Discharging of the ACS's AC filter (XCD) is mandatory when using the system with a plug connection. The XCD option ensures a discharge time of the AC filter of <1 s as required by EN 62477-1

Prepared Module Slot (CASE.PREP.*)

A major advantage of the fully modular concept of the ACS product family is the ability to cover future requirements for higher power, voltage, or current levels with an additional 30 kVA or 50 kVA base unit. Systems can therefore initially be equipped with one ACS device less. The reserve slot is pre-wired and fully tested. The integration of the additional 30 kVA or 50 kVA unit can easily be carried out by the user on-site at a later stage.

The specific order code for the prepared module slot depends on the cooling type of the selected system:

- CASE.PREP.A
- CASE.PREP.L

Base Plate (CASE.PLATE)

The additional base plate completely covers the bottom of the enclosure. Cable routing will therefore only be possible via the cable brushes in the rear door.

Handles (CASE.HANDLE)

The handles offer more convenience for frequent repositioning of the mobile systems. The handles are mounted at a suitable working height on the left and right sides of the system front.

X609 Interface (CASE.IF.X609)

This optional connection box provides easy access to the X609 interface of the ACS. It provides 4 convenient BNC connectors for 4 analog outputs. Further, 4 analog inputs are accessible through a multi-pin connector.



Figure 7: X609 interface box. Providing 4 BNC and a multi-pin connector.

Overview of Options

Order Code	Short Description
SAFBUS.5	Safety bus cable, 5 m length
CASE.ACS.COM.KIT.3	Conection kit for signal transmission and grounding for multi-system operation, 3 m length
INACC.CEE63.400.5	AC cable with CEE63 plug up to 63 A available for SYS.30.*, requires XCD option on ACS device
INACC.CEE125.400.5	AC cable with CEE125 plug up to 125 A available for SYS.50.*, requires XCD option on ACS device
CASE.PREP.A	Prepared bay for an additional 30 kVA or 50 kVA air-cooled device
CASE.PREP.L	Prepared bay for an additional 30 kVA or 50 kVA liquid-cooled device
CASE.PLATE	Closed bottom of the enclosure
CASE.HANDLE	Handles for improved mobility
CASE.IF.X609	Interface for X609 connector. Provides 4 BNC and a multi-pin connector

Summary

ACS Standard Systems

- Single systems with 30...100 kVA, scalable with multi-system operation
- Easy reconfiguration between single channels and parallel connection with mixed 30 kVA and 50 kVA power modules
- Safety circuit with performance level e (PL e) following category as per DIN EN ISO 13849-2:2012
- Mobile and pluggable rack solutions on castors
- CE/UKCA marking with test protocols according to EN 61439-2 and comprehensive operating instructions and system description
- Highest quality standards by industrial manufacturing, automated testing of safety and control circuit, and reported long-term testing at full power ratings

Customization

Engineering on Demand

Do you have additional requirements for the standard system capabilities described before? Are higher power, higher voltage ratings, or test bench-specific interfaces necessary? REGATRON's experts will be at your assistance. REGATRON's customized and turnkey test systems are always developed in close contact between our field application engineers and the customer, from the initial concept discussion to demanding factory acceptance tests and product training.

Load Configuration

- High power configurations up to 2000+ kVA range
- Voltage adaptation from a few volts up to 1000+ V by means of step-down and step-up transformers from 16...1000 Hz
- Voltage drop compensation and surge protection
- Automated reconfiguration options "RSC" between different voltage levels are available

Safety

- Galvanic isolation
- Customer-specific safety interfaces and safety wiring for multi-system operation with more than three systems
- Insulation monitoring for galvanically isolated systems
- Residual current monitor (RCD) for grounded systems

Environmental Conditions

- Air or liquid-cooled systems
- Increased protection against shocks and vibrations during frequent transportation due to the sophisticated flight case design

Convenient Handling

- Pluggable load cables
- Application-specific automation with predefined grid settings and wiring configurations
- The load connection point for the DUT can be installed separately from the power supply using the power distribution unit (PDU). If space is limited in the test bench, the power supply system can be installed in the equipment room. The PDU is designed for wall mounting to save space and offers a wide range of features, such as power connectors, sense connection, emergency stop button, including a safety door limit switch, and status indicators
- Mains adaptation to 220, 600, and 690 V_{AC} with an auto-transformer
- Third-party product integration with optional AC supply
- Notebook drawer



Figure 9: 100 kVA system solution with galvanic isolation and an industrial PC for easy operation in the laboratory.

Customization Examples



Figure 8: Test solution with AC mains cable and preconfigured country-specific outlets selectable manually or via the automation system.



Figure 10: REGATRON's fully compliant EMC test system with an integrated power analyzer for measuring flicker and harmonics, voltage slope enhancer, and flicker impedance. The mobile test system is equipped with high-quality castors and convenient handles.

This product is developed, produced, and tested according to ISO 9001 by REGATRON.

For detailed technical information, contact REGATRON or your local sales partner

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