

# INV

## DC/AC industrial IGBT inverter for industrial applications

Lead acid or NiCd batteries

Output voltage 1Ph or 3Ph, input voltage 110V<sub>dc</sub> o 220V<sub>dc</sub>, output power from 5 to 120 kVA

*INV model is the LEVER digital inverter, designed to supply critical loads in alternating current by means of a centralized battery bank*

- **IGBT-based** digital inverter with **PWM control logic** to guarantee a stable voltage and a pure AC output sinewave output, including with non-linear loads
- INV operating modes: “**On-Line**”, where the inverter is in operation and supplies power to the load, “**Line-Interactive**”, where the output voltage is supplied by the emergency mains through the bypass to increase the efficiency of the system, and the inverter remains in hot stand-by for emergency
- Wide range of output AC voltage
- LEVER INV is an **engineered product, fully customizable** and with a wide range of options, to comply with **Client technical specifications**



### Applications

INV inverter is designed and developed for a wide range of applications in the most demanding industrial environments

- **Oil & Gas** (petrochemicals offshore, onshore, pipelines)
- **Utilities & Power generation** (power plant, transmission, distribution)
- **Water** (desalination, treatment)
- **Instrumentation & Process control** (chemical, mining, steel, paper)
- All the **industrial** applications

### Models available

| Input voltage       | Output voltage                                 | Output power |
|---------------------|------------------------------------------------|--------------|
| 110 V <sub>dc</sub> | 1F - 115 V <sub>ac</sub> / 230 V <sub>ac</sub> | 5 – 60 kVA   |
|                     | 3F - 190 V <sub>ac</sub> / 400 V <sub>ac</sub> | 10 – 60 kVA  |
| 220 V <sub>dc</sub> | 1F - 115 V <sub>ac</sub> / 230 V <sub>ac</sub> | 5 – 120 kVA  |
|                     | 3F - 190 V <sub>ac</sub> / 400 V <sub>ac</sub> | 10 – 120 kVA |

### Key features

- **AC output voltage THD < 1%** (with linear load)
- “Line-Interactive” operating mode efficiency >98%, “On-Line” operating mode efficiency >92%
- Digital technology with the microprocessor control
- Reliable **SCR-based static bypass switch**. The inverter is also equipped with a manual switch for the maintenance operations without disconnecting the load
- Compatibility with **lead acid** VRLA, AGM, Gel and **NiCd** batteries
- Provided with a **4.3” HMI display**, which shows the measurements, the alarms and the system mimic diagram and allows the configuration of the parameters
- Communication interfaces available: Ethernet, Modbus, dry contacts SPDT module
- Simple and fast integration with any existing battery chargers on the system

### Technical data

#### Input

|                                 |                                                                                                       |
|---------------------------------|-------------------------------------------------------------------------------------------------------|
| Rated input DC voltage          | 110, 220 V <sub>dc</sub>                                                                              |
| DC voltage tolerance            | ±20%                                                                                                  |
| Rated input AC voltage (bypass) | 1Ph 115 V <sub>ac</sub> , 3Ph 190 V <sub>ac</sub> , 1Ph 230 V <sub>ac</sub> , 3Ph 400 V <sub>ac</sub> |
| AC voltage tolerance (bypass)   | -20%, +10%                                                                                            |
| Frequency (bypass)              | 50-60 Hz                                                                                              |
| Frequency tolerance (bypass)    | ±10%                                                                                                  |

#### Output

|                      |                                                                                                       |
|----------------------|-------------------------------------------------------------------------------------------------------|
| Rated output voltage | 1Ph 115 V <sub>ac</sub> , 3Ph 190 V <sub>ac</sub> , 1Ph 230 V <sub>ac</sub> , 3Ph 400 V <sub>ac</sub> |
| Output power         | From 5 to 120 kVA                                                                                     |
| AC waveform          | Sinewave with voltage THD <1%                                                                         |
| Voltage regulation   | ±10%                                                                                                  |
| Frequency regulation | ±10%                                                                                                  |
| Overload admitted    | 100-110% for 2 hours, 110-125% for 10 min, 125-150% for 10s                                           |

#### Battery

|              |                                                 |
|--------------|-------------------------------------------------|
| Type         | Lead acid and NiCd (all types)                  |
| Back-up time | As required (from few minutes to several hours) |

#### Inverter technology

|         |                                         |
|---------|-----------------------------------------|
| Type    | IGBT full bridge with PWM control logic |
| Cooling | Forced, two levels of fan speed         |

#### Efficiency at 100% load

|                       |      |
|-----------------------|------|
| On-Line mode          | >92% |
| Line-Interactive mode | >98% |

#### Instrumentation

|                               |                                            |
|-------------------------------|--------------------------------------------|
| HMI display                   | 4.3" LCD panel                             |
| Visual alarms and indications | Up to 20 signalizations on HMI             |
| Communication interfaces      | Modbus, Ethernet, dry contacts SPDT module |

#### Static switch

|                                |                     |
|--------------------------------|---------------------|
| Technology                     | SCR                 |
| Max overload current for 10 ms | 10 x I <sub>N</sub> |
| Transfer time                  | <2 ms               |

#### General data

|                          |                                                           |
|--------------------------|-----------------------------------------------------------|
| Acoustic noise at 1 m    | <60 dBA                                                   |
| Maximum altitude         | 1000 m                                                    |
| Cabinet cooling          | Natural                                                   |
| Cabinet IP degree        | IP20 (open and closed door), IP42 (closed door, optional) |
| Cabinet type             | Standard modular cabinet RAL7035 2200mm high              |
| Metal standard thickness | 2,5 mm (frame), 2,0 mm (door)                             |
| Cable entry              | From the bottom                                           |
| Humidity range           | From 10% to 95% not condensated                           |
| Operating temperature    | From 0°C up to +55°C                                      |
| Storing temperature      | From -20°C to +70°C (battery excluded)                    |
| Relevant IEC             | IEC 62040-1, IEC 62040-2, IEC 62040-3, IEC 62040-4        |