

## imc ARGUSfit Base Unit

Base unit for fast, compact and modular expandable measurement systems



### imc ARGUSfit – fast, compact and modular measurement systems

imc ARGUSfit is a compact modular system that allows the user to flexibly assemble fast data acquisition systems (DAQ). Both the base unit and the flexibly combinable measuring modules have independent housings which are connected by a "click" mechanism (no tools required) to form a DAQ system. This modularity includes not only measurement amplifiers but also interface modules such as for CAN bus.

imc ARGUSfit covers the entire frequency range of physical measurement applications with an aggregate sampling rate of up to 5 MS/s and channel rates of up to 500 kSample/s, depending on the module type. Various such measurement modules for common signals and sensors are available and more will be released in the future.

In addition, interface modules can be added to integrate common field and vehicle buses such as CAN FD into the data acquisition and to exchange measurement data via these communication standards.

The system achieves particular flexibility by extending modularity even to decentralized topologies. The internal ARGUS high-speed system bus can be converted to fiber optic cables by means of a media converter extension module in order to integrate spatially distributed module blocks.

imc ARGUSfit also provides complete integration of the imc CANSASfit module series for slower channels, e.g. for temperature measurement: while fast imc ARGUSfit modules are docked to the bottom (right side) of the imc ARGUS base (high-speed system bus), imc CANSASfit modules can be clicked onto the top (left side). Such CANSASfit modules (CANFT) are likewise internally connected with power and CAN bus and are fully supported and integrated by the software as a uniform system. Finally, CANFT modules can even be installed in distributed topologies and connected via CAN-cable to the CANSAS-Interface of the base unit, provided on a dedicated LEMO.0B terminal.

The resulting DAQ system is networked by Ethernet and configured via a connected PC. In measurement mode, the PC can then serve as a sink for recorded data (continuous "streaming").

In stand-alone operating mode, the PC is not even required and the measurement data can also be stored on removable microSD flash memory. Live measurement data can already be pre-processed or evaluated by onboard realtime analyses (imc Online FAMOS). This applies to stand-alone mode, too. Typical analysis functionalities and applications include limit value monitoring, min./max. statistics, digital filters, spectral analysis, order analysis, classification and much more.

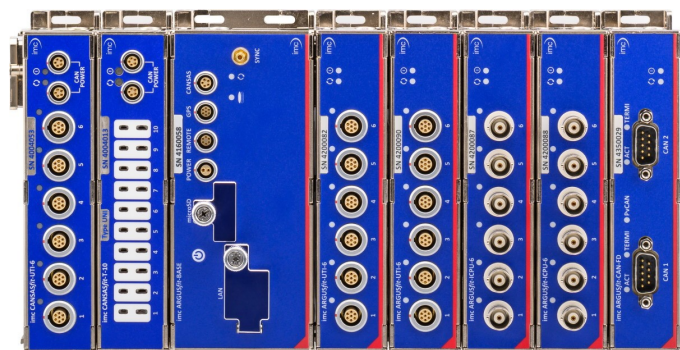
Multiple DAQ systems of the imc ARGUSfit series as well as other imc data logger and measurement systems can be interconnected via Ethernet. This allows to operate very large and multi-channel setups in which different imc device series work together uniformly and fully synchronized. The Ethernet interface can then be used for communication and data exchange as well as for absolute time synchronization of the entire system (via NTP).

### At a glance:

- Very compact, high-performance data acquisition system (DAQ)
- Particularly flexible: modular system without mainframe
- Click mechanism: connects modules electrically and mechanically
- Modularity for both analog amplifiers and digital interface modules
- Decentralized installations supported via fiber optic cable for high-speed system bus
- imc ARGUSfit amplifiers for almost any physical sensor and signal type
- Up to 5 MS/s aggregate system sampling rate
- High channel data rates (and bandwidths), up to 500 kS/s at 24-bit resolution, depending on the module type
- Multiple individual channel sampling rates
- Integrated real-time analysis through built-in imc Online FAMOS
- Full integration of imc CANSASfit
- Combination with all imc system families and synchronous acquisition of thousands of channels
- Comfortable operation with uniform and modern imc STUDIO software for all imc systems.

### imc ARGUSfit: Modules and the system

imc ARGUSfit complete DAQ systems are built around a base unit and can be composed of a number of imc ARGUSfit amplifier and interface modules (bottom/right), imc CANSASfit modules (top/left). In addition to the mechanical connection, the click connectors provide a backbone for power supply, data transfer via system bus or CAN bus, trigger, synchronization and fully integrated operation.



For expansion to decentralized distributed topologies, the system bus can be converted to fiber optic cables by means of a clickable fiber converter module. Furthermore, additional imc CANSASfit modules can also be connected via an additional CAN bus cable.

A battery buffered UPS module is available to compensate short term power failures such as with automotive applications that need to include the startup process (cold-cranking) or start-stop functions in the measurements.

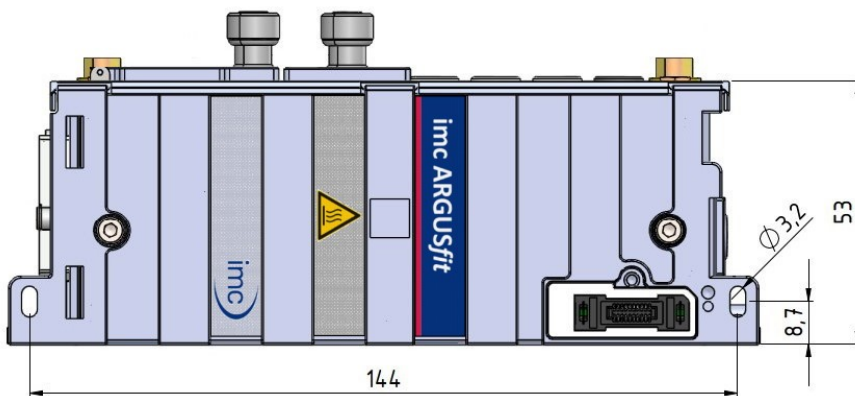
**imc Online FAMOS**

imc Online FAMOS is a powerful extension included in every imc ARGUSfit DAQ system as a standard without any additional license required. It offers a variety of real-time functions for pre-processing and signal analysis. The mathematical analysis functions are executed on the signal analysis platform integrated in the measurement device. This means that analysis results are available immediately and also independently of the PC. Such pre-processing can also yield significant data reduction and thus reduce the amount of data to be exchanged between the DAQ system and the PC. The results are available in imc STUDIO as virtual channels.

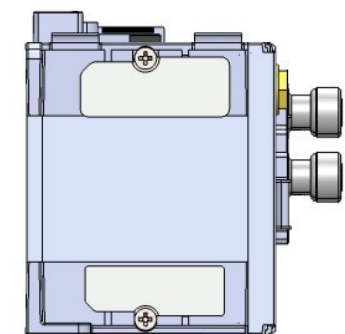
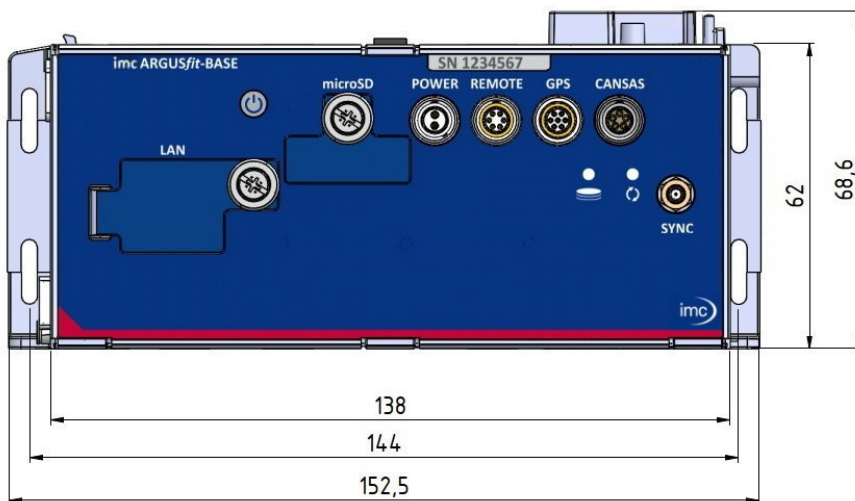
**Software minimum requirements**

Operation of the imc ARGUSfit system requires operating software of the following group: imc STUDIO 2023 R3.

**Dimensions**



Base unit shown in standard operating position (terminal connections upwards).



*left module panel with parking position for the covers of the module connectors*

**Overview of the available variants**

| Order Code      | properties   | article no. |
|-----------------|--|-------------|
| ARGFT-BASE      | high speed, compact and modular measurement system   | 11400200    |
| ARGFT-BASE-WLAN | variant of the ARGFT-BASE with internal WiFi adaptor dual band (802.11n, max. 300 Mbit/s including 2 antennas) | 11400233    |

**Included accessories**

| Power supply and connectors                                      |   |             |
|--|---|-------------|
| Order Code   | properties  | article no. |
| ACC/AC-ADAP-24-60-0B   | AC/DC power adaptor: 24 V, 60 W, connector: LEMO.0B 2-pin                         | 13500246    |
| ACC/POWER-PLUG3  | DC-power connector (plug for power socket)  | 13500033    |
| ACC/NFC-STRAP-10   | NFC/RFID Sensor-tag for imc SIMPLEX<br>Tags as cable tie (140mm), 10 pieces       | 13500450    |
| ACC/NFC-STICKER-10   | NFC/RFID Sensor-tag for imc SIMPLEX<br>Tags as adhesive sticker (30mm), 10 pieces | 13500451    |
| Documents  |   |             |
| Getting started with imc ARGUSfit (one copy per delivery)        |   |             |
| Device certificate   |   |             |
| Miscellaneous  |   |             |
| 1x Ethernet network cable with latch protection (uncrossed, 2 m) |   |             |

**Optional accessories**

| Power supply: cables and connectors                             |  |             |
|---|--|-------------|
| Order Code  | properties   | article no. |
| ACC/CABLE-LEMO-0B-BAN-2M5                                       | Supply cable for ARGUSfit BASE (LEMO.0B.302), Banana terminals, 2.5 m  | 13500276    |
| ACC/CABLE-LEMO-LEMO-2M5   | Connection cable for CANSASfit modules, 2 x LEMO.0B.305, 2.5 m<br>Use of Power-via-CAN on base unit: supply of CANFT via ARGFT-BASE  | 13500229    |
| ACC/CABLE-LEMO-LEMO-PWROB-2M5                                   | Connection cable for CANSASfit modules, 2 x LEMO.0B.305, 2.5 m<br>Power-via-CAN not used on base unit: power feed for CANFT via LEMO.0B.302 female (for ACC/AC-ADAP-24-60-0B)  | 13500429    |
| ACC/CABLE-LEMO-LEMO-PWR-2M5                                     | Power splitter adapter for CANSASfit connection cable, 2 x LEMO.0B.305 (male & female), 0.5 m<br>Power-via-CAN not used on base unit: power feed for CANFT via banana terminals. To be used in conjunction with 13500229 | 13500324    |
| ACC/REMOTE-0B   | connector for remote   | 13500050    |
| FiberConverter  |  |             |
| ARGFT/FIBER-CONVERTER-SET                                       | Media converter for the ARGUS system bus<br>Includes: 2 converter modules, 2x SFP+ transceiver, 5 m fiber optic cable, AC/DC power adaptor and a power plug  | 11400225    |
| microSD storage media   |  |             |
| ACC/MICROSD-512GB-ET  | microSD Flash memory card 512 GB   | 135000xx    |
| ACC/MICROSD-256GB-ET  | microSD Flash memory card 256 GB<br>Only microSD memory cards tested by imc should be used, as these have been specially qualified by us for high data rate of 5 MS/s.   | 13500042    |
| Miscellaneous   |  |             |
| ARGFT/GPS-MOUSE-5HZ   | external GPS receiver (5 Hz, High Sensitivity with 7-pin LEMO.0B connection and 5 m connection cable)  | 11400234    |
| Mounting accessory (magnetic mounting and set for Top-hat rail) |  |             |

## Technical Specs - Base Unit

| Terminal connections                    |  |  |
|---|--|--|
| Parameter                               | Value  | Remarks  |
| PC / network<br>Ethernet TCP/IP ("LAN") | RJ-45<br>1000BASE-TX (1 GBit/s)<br>100BASE-TX (100 MBit/s) | PC/network, synchronization<br>fix and dynamic IP address<br>protocol: IPv4  |
| Flash storage ("microSD")               | microSD slot   | with protection cap  |
| Internal WLAN adaptor                   | 2 antennas<br>IEEE 802.11g/n/ac<br>Dual Band (2.4 / 5 GHz) | only with ARGFT-BASE-WLAN <sup>1</sup><br>(article no. 11400233, "in preparation")   |
| Synchronization ("SYNC")                | SMB  | IRIG-B, isolated   |
| External GPS module ("GPS")             | LEMO.0B (7-pin)  | GPS receiver available as accessory  |
| Remote control ("REMOTE")               | LEMO.0B (6-pin)  | remote power on/off  |
| Power ("PWR")                           | LEMO.0B (2-pin)  | compatible to LEMO.EGE.0B.302<br>recommended plug FGG.0B.302   |
| imc CANSASfit Interface<br>("CANSAS")   | LEMO.0B (5-pin)  | connection of distributed imc CANSASfit<br>modules: Power supply provided by base unit<br>(Power-via-CAN, max. 1 A)              |
| Module connector                        | Click connection<br>(with covering caps)                   | mechanical connection,<br>common DC power supply,<br>system bus for imc ARGUSfit modules,<br>interface for imc CANSASfit modules |

| Power supply              |  |  |
|---------------------------|--|--|
| Parameter                 | Value  | Remarks  |
| Input supply voltage      | 10 V to 50 V DC  |  |
| Power-on threshold (typ.) | ≥9.5 V   | min. input voltage required for power-on<br>(no load)  |
| Shutdown threshold (typ.) | ≤8.5 V   | input voltage at which the automatic shutdown is<br>triggered (microSD data backup secured by<br>internal buffering) |
| Power consumption         | 3.3 W (typ.)<br>3,1 W (typ.) @ 12 V DC<br>3,6 W (typ.) @ 48 V DC | plus 2 % / 10 K  |
| Isolation                 | ±60 V  | against housing  |
| AC/DC power adaptor       | 110 V to 230 V AC  | external adaptor 24 V / 60 W included in delivery  |

<sup>1</sup> Official Admission certified for Japan, US, Canada, China, Taiwan, Korea

| <b>Max. number of modules for direct coupling (block size with click mechanism)</b>                       |  |   |
|---|--|---|
| <b>Parameter</b>  | <b>Value</b>                                   | <b>Remarks</b>  |
| Compatible modules  | imc ARGUSfit (ARGFT)<br>imc CANSASfit (CANFT)  | simultaneous operation of imc ARGUSfit and imc CANSASfit modules supported  |
| Max. number of modules  | max. n ARGFT modules<br>+ max. 8 CANFT modules | analog and fieldbus interface modules;<br>n modules see Excel power configurator  |
| <b>Pass through power limits for directly connected modules (click mechanism)</b>                         |  |   |
| <b>Parameter</b>  | <b>Value</b>                                   | <b>Remarks</b>  |
| Max. current  | 5 A  | at 55 °C<br>current rating of click connector to ARGFT and CANFT modules  |
|   | 60 W at 12 V DC<br>120 W at 24 V DC            | typ. DC vehicle voltage<br>AC/DC power adaptor or installations   |
| <b>Power delivered by ARGUS Base and fed out to CANFT Interface (Power-via-CAN via LEMO.0B, "CANSAS")</b> |  |   |
| Max. current  | 1 A  | at 55 °C, overload and short-circuit protected<br>As long as the base unit is connected to a DC supply voltage, the CANFT modules are permanently supplied via the CANSAS socket regardless of the operating state (on/off) of the base unit. |
|   | 12 W at 12 V DC<br>24 W at 24 V DC             | typ. DC vehicle voltage<br>AC/DC power adaptor or installations   |
| <b>Total supply power fed in at the ARGUS Base (via LEMO.0B, "POWER")</b>                                 |  |   |
| Max. current  | 5 A  | at 55 °C<br>current load capacity of the LEMO and internal elements. Total power of ARGFT Base and docked ARGFT and CANFT modules and the CANFT-Interface "CANSAS" with Power-via-CAN   |
|   | 60 W at 12 V DC<br>120 W at 24 V DC            | typ. DC vehicle voltage<br>AC/DC power adaptor or installations   |
| <b>UPS and Data integrity</b>   |  |   |
| <b>Parameter</b>  | <b>Value</b>                                   | <b>Remarks</b>  |
| Autarkic operation  | ✓  | Stand-alone data acquisition operation (Auto-start) without PC connection required  |
| Auto data-saving upon power outage  | ✓  | internal power buffering (UPS) to ensure data integrity with "auto-stop"<br>auto-stop of measurement, data storage and automatic shutdown   |
| UPS   | integrated                                     | Super-Caps  |
| Charging time of the Super-Caps   | approx. 60 s                                   | minimum required active operation for full UPS functionality  |
| UPS coverage  | ARGFT base unit                                | no buffering of directly connected modules  |
| UPS delay   | 0 s  | "buffer-time constant":<br>required duration of a continuous outage that will trigger auto shutdown procedure<br>fixed parameter: cannot be changed in the device configuration!  |

| Operating conditions                     |  |   |
|--|--|---|
| Parameter                                | Value  | Remarks   |
| Operating environment                    | dry, non corrosive environment within specified operating temperature range  |   |
| Ingress protection class                 | IP50   | with correctly mounted covers over both module connectors                               |
| Pollution degree                         | 2  |   |
| Operating temperature range              | -15 °C to +55 °C   | without condensation  |
| Shock- and vibration resistance          | IEC 60068-2, IEC 61373<br>IEC 60062-2-64<br>category 1, class A and B<br>MIL-STD-810<br>Rail Cargo Vibration Exposure<br>U.S. Highway Truck Vibration Exposure |   |
| Extended shock- and vibration resistance | upon request   | specific tests or certification upon request  |
| Dimensions (L x W x H)                   | 153 x 62 x 53 mm   | including mounting flanges and click mechanism, see mechanical <a href="#">drawings</a> |
| Weight                                   | 0.5 kg   |   |

| Storage, signal processing                       |  |   |
|--|--|---|
| Parameter  | Value  | Remarks   |
| Removable flash storage                          | microSD  | recommended media available at imc; the specified operating temperature range of the media is relevant;<br>Only microSD memory cards tested by imc should be used, otherwise performance or data integrity may be degraded. |
| Typ. supported transfer rates (write) to microSD | 10 channels at 500 kHz<br>50 channels at 100 kHz | guaranteed with imc qualified media (256 GB), only. Test conditions: data transfer to PC not activated, no additional OFA channels  |
| Interval memory mode                             | ✓  | cyclical termination of the measurement data on mass storage medium   |
| Extensive real-time analysis functions           | ✓  | imc Online FAMOS included in standard delivery  |

| Data acquisition, trigger                       |  |  |
|---|--|--|
| Parameter                                       | Value  | Remarks  |
| Max. aggregate sampling rate                    | 5 MS/s   | sum of sampling rates of all active channels   |
| Channel individual sampling rates               | selectable in 1–2–5 steps                      | max. 500 kS/s, depending on ARGFT module   |
| Number of sampling rates measurement channels   | arbitrary                                      | can be used for all hardware-bound channels, such as analogue channels, simultaneously in one configuration                                    |
| Number of sampling rates fieldbus channels      | arbitrary                                      |  |
| Number of sampling rates virtual channels       | arbitrary                                      | further rates generated by imc Online FAMOS (e.g. by means of reduction)   |
| Intelligent trigger functions                   | ✓  | logical combination of multiple channel events (threshold, transition) to create triggers that start and stop acquisition of assigned channels |
| Multi triggered data acquisition re-arming time | ✓<br>typ. 30 ms                                | Multi-shot (with automatic re-arming of the measuring system).<br>depending on system load   |
| Multi trigger                                   | max. 8   | independent trigger definitions with arbitrary channel assignments (start/stop)  |
| Trigger definitions                             | as logical AND/OR combinations of events       | events: threshold value, edge, range   |
| Number of event calculations                    | analog: 1 per module<br>fieldbus: 8 per module |  |
| Number of events used                           | 8 per trigger definition<br>64 used per device |  |

| Maximum channel count per device    |                        |   |
|-------------------------------------|------------------------|---|
| Parameter                           | Value                  | Remarks   |
| Active channels within a systems... | 1000                   | active channels of the current configuration: Total number of analog, fieldbus and virtual channels, as well as monitor channels, if any. |
| ...of which active analog channels  | 1000                   | active analog channels of the current configuration (sum of primary channels + monitor channels)  |
| For fieldbus log channels           | any number of channels | log channels: non-decoded CAN traffic ("dump")  |

| Monitor channels                    |   |  |
|-------------------------------------|---|--|
| Parameter                           | Value   | Remarks  |
| Monitor channels                    | for all channels of the type:<br>analog       | derived from primary channel with pre-processing function, (processed on the amplifier modules, independent of imc Online FAMOS)   |
| Pre-processing for Monitor channels | reduction<br>AAF<br>RMS<br>Minimum<br>Maximum | each with a reduction factor or block size R selection 1 out of n:<br>resampling<br>resampling with adapted low pass filter<br>RMS over block size R<br>statistics over block size R |
| Reduction factor R                  | 2 .. 10.000.000<br>individually selectable    | block size or resampling for the processing functions  |

| Synchronization and time base: single device without external synchronization |              |             |  |
|---|--------------|-------------|--|
| Parameter   | Value (typ.) | min. / max. | Remarks                                |
| Accuracy RTC  |              | ±50 ppm     | at 25 °C                               |
| Drift   | ±20 ppm      | ±50 ppm     | -15 °C to +55 °C operating temperature |
| Ageing  |              | ±10 ppm     | at 25 °C; 10 years                     |

| External synchronization    |   |                          |  |                      |
|-----------------------------|---|--------------------------|--|----------------------|
| Parameter                   | GPS                                       | IRIG-B                   | NTP  | PTP (in preparation) |
| Supported formats           | NMEA / PPS <sup>(1)</sup>                 | B002, B006               | Version ≤4                                 | Version 2            |
| Precision                   | <1 μs                                     |                          | <5 ms<br>after approx. 12 h <sup>(2)</sup> | <1 μs                |
| Jitter (rms) <sup>(3)</sup> | <100 ns                                   |                          | ---  | <100 ns after 120 s  |
| Voltage level               | TTL (PPS <sup>(1)</sup> )<br>RS232 (NMEA) | 5 V TTL level            |  |                      |
| Input connection            | LEMO.0B (7-pin)                           | SMB "SYNC"<br>(isolated) | RJ45 "LAN"                                 | RJ45 "LAN"           |

| Synchronization via multiple devices with IRIG-B (Master/Slave) |              |             |   |
|---|--------------|-------------|---|
| Parameter   | Value (typ.) | min. / max. | Remarks   |
| Common mode<br>SYNC isolated                                    |              | max. 50 V   | SMB socket: isolated; for reliable operation even with different common mode level (ground loops) |
| Input impedance   |              | 20 kΩ       |   |

1 PPS (Pulse per second): signal with an impulse >5 ms is necessary; current max.= 220 mA

2 Initial synchronization

3 Mean statistical variation. Also dependent on signal quality with IRIG-B (e.g. direct connection to imc master device) respectively the specific network configuration with PTP (e.g. point-to-point connection via PTP-capable network switch such as imc NET-SWITCH-5).