DOMINO
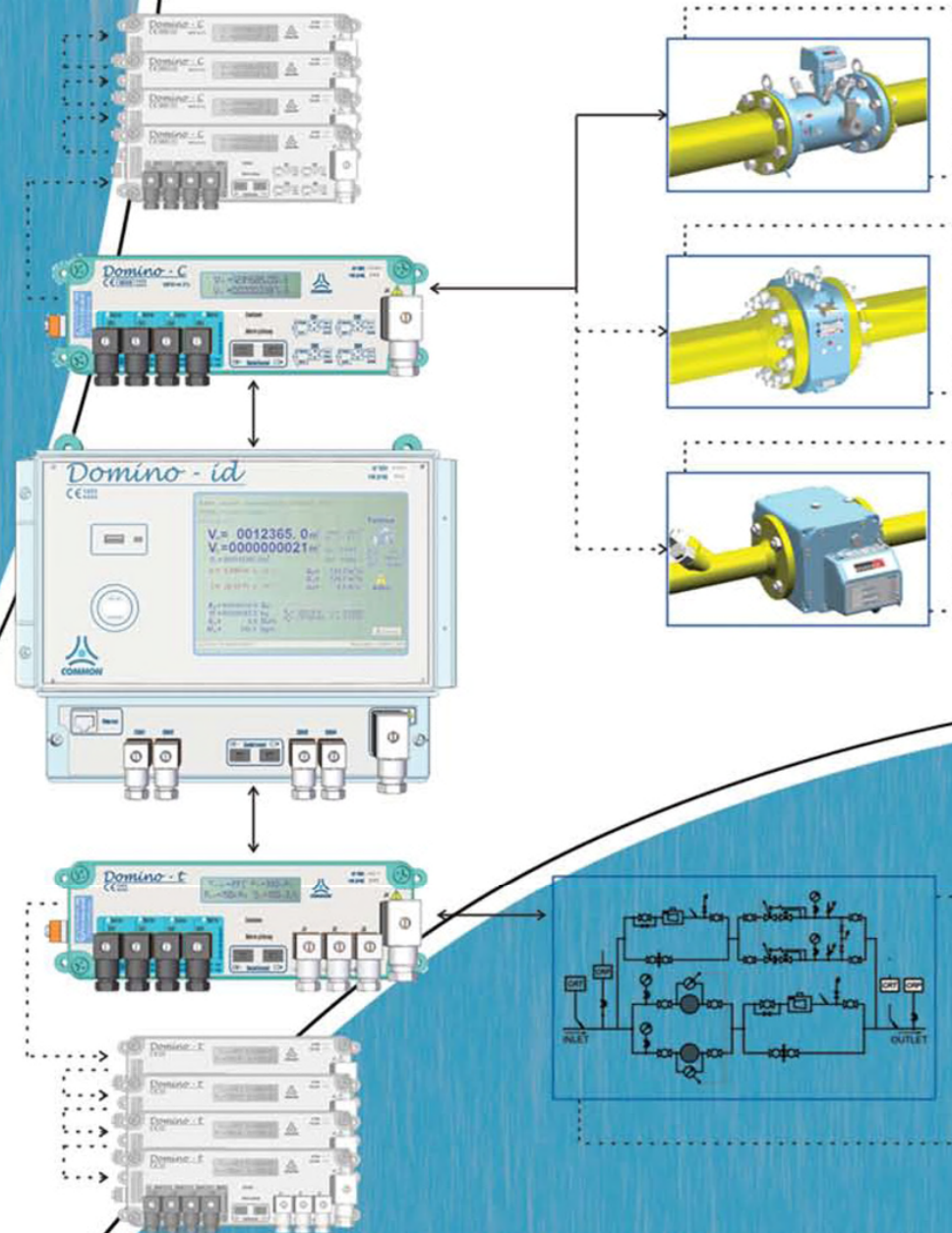# GAS VOLUME COMPUTER

L.p.	Description	Domino-c (calculation unit)	Domino-t (controlling unit)	Domino-c (indication unit)
1	Intrinsic safety designation	EX II (1)G [Ex ia] IIC	EX II (1)G [Ex ia] IIC	
2	Accordance with standards	ATEX, MID, LVD	ATEX, LVD	ATEX, LVD
Casing [length/width/height] [mm]				
3	Dimensions, versions: 19" mounted on board	482 x 89,5 x 88 230 x 80 x 65	482 x 89,5 x 88 230 x 80 x 65	482 x 249 x 132,5 280 x 219 x 156
4	Dimensions, versions: 19" mounted on board	IP40 IP65	IP40 IP65	IP40 IP65
Power supply				
5	Power supply range	230V -15/+10% 50÷60Hz	230V -15/+10% 50÷60Hz	230V -15/+10% 50÷60Hz
6	Power consumption Maximum/Regular	4W/2W	4W/2W	20W/10W
7	Internal battery operation time at full functionality of the device	Pulse method About 48h	About 48h	About 6h
		Orifice method About 20h	About 48h	About 6h
Weather conditions				
8	Ambient temperature: 19" mounted on board	+5 ÷ +55°C -25 ÷ +55°C	+5 ÷ +55°C -25 ÷ +55°C	+5 ÷ +55°C -25 ÷ +55°C
9	Humidity	Max 95% at 55°C	Max 95% at 55°C	Max 95% at 55°C

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DOMINO volume computer is a gas volume converter which mainly converts real into normal conditions of a gas. DOMINO is fully compliant with MID directive (Measuring Instruments Directive). According to Polish norm PN-EN12405-1:2007+A1 and other standards ZN-G-4000:2001 series, DOMINO is type 2 converter (main power supplied).

As the first converter on the market, the construction is based entirely on modules and every product consists of 3 independent units:

- **Domino – c** (calculation and processing unit)
- **Domino – t** (steering and controlling unit)
- **Domino – id** (indication and visualization unit)

The units can be combined into various measurement sets using one or more calculation and controlling units with one indication unit with optical fiber up to 10 meters. The innovation of the solution is conducive to any configuration with different number of gas meters, inputs/outputs of analog bistable communication signals. One calculation along with one controlling unit and indication unit is expected to work with one gas meter. An indication unit can cooperate with up to 8 gas meters.

ADVANTAGES

INNOVATION – The first main powered converter with construction based entirely on modules and HART digital communication circuits on all 4-20mA channels

VERSATILITY – modular construction allows to create free configuration of connected gas meters, inputs/outputs of analog bistable communication signals. Replacement of controlling or indication modules doesn't stop the work of calculation unit, thus the continuum of the conversion process is preserved.

FUTURE SOLUTIONS – The device is fully compliant with the requirements of MID directive (Measuring Instruments Directive), therefore the equipment is not subject to type approval expiration restrictions.

SAFETY – every module contains circuit breakers in every channel, independent power line with its own UPS system (Uninterruptible Power Supply) – calculation unit can work up to 48 hours. Thanks to optical fiber cables among modules intermodule separation is achieved – interferenceson communication lines do not interfere with calculation unit.

ACCURACY – Device is "transparent" to the work of measurement unit. The error of determination algorithm VB (VN) is smaller than 0,0001%. Communication with measurement transducers through HART protocol guarantees the highest accuracy of measurement.

TECHNICAL DATA

Two versions of execution: for 19" cases or mounted on board

Modules description:

Domino-c (calculation and processing unit) is a PTZ computing unit which counts the amount of pulses then figures: the corrected volume VC considering error curve, volume in base conditions VB (normal conditions VN). It consists of the following circuits:

- Intrinsic safe circuits:
  - 4 independent 4÷20mA + HART inputs along with the power unit
  - 2 LF pulse inputs with $f_{max} \leq 2Hz$ NAMUR type (according to PN-EN 60947-5-6:2002)
  - 2 HF pulse inputs with $f_{max} \leq 5kHz$ NAMUR type (according to PN-EN 60947-5-6:2002)

(present PN-EN 60947-5-6:2002 standard in force puts into effect additional requirements e.g. guarantee the possibility of monitoring the alarm states - broken LF circuit)

- Non-intrinsic safe circuits:
  - 1 optical fiber input/output to connect with the other modules
  - 1 $230V_{AC}$ main power circuit

Domino-t (steering and controlling unit) enables to carry out measurements and controls of technological processes. It consists of the following circuits:

- Intrinsic safe circuits:
  - 4 independent 4÷20mA+HART inputs along with the power unit
  - 4 or 8 digital inputs
- Non-intrinsic safe circuits (every circuit has an independent galvanic isolation):
  - 1 optical fiber input/output to connect with the other modules (up to 10 meters)
  - 1 analog 4-20mA output
  - 1 0-5V input (cathodic protection)
  - 2 bistable inputs with possible extension up to 8
  - 1 Open Collector state/pulse type output (may be used to control odourizing unit)
  - 1 Open Collector state/pulse type output
  - 1 230VAC main power circuit

Domino-id (indication unit) is a module which enables to configure and visualize all necessary parameters from every connected module. It is equipped with a 6,5" touch screen. Additionally, the device consists of: 4 RS232/RS-485 serial galvanically isolated ports used for readout the collected data from databases of individual modules (choice between RS232/RS-485 is made by the user during the installation process); USB port; 10/100Mbps Ethernet port.