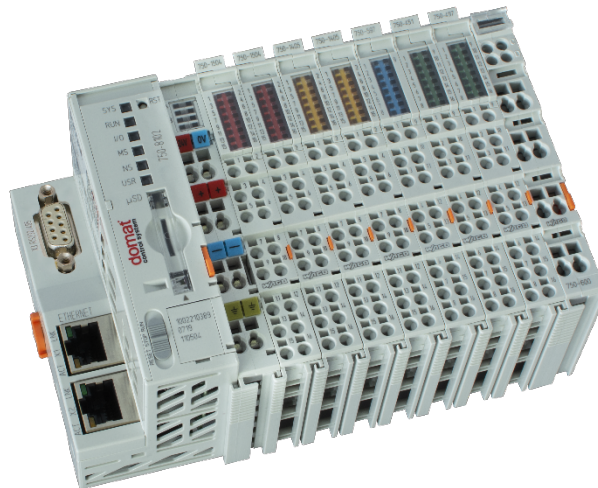


order number

**wMXcom**

**DDC controller**



#### Summary

DDC (Direct digital control) controller wMXcom is a compact PLC with Domat RT. The controller contains two Ethernet ports and a datapoint mix of 16 AI, 32 DI, 8 AO a 32 DO. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O modules within the 750/753 series.

#### Application

- Freely programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

#### Function

Controller wMXcom has twin-port Ethernet interface and thanks to integrated switch it is able to create bus topology.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Domat IDE
- Direct connection of I/O modules
- 2 × Ethernet (configurable)
- Operating system Linux
- Maintenance free / Low maintenance

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

IO modules (16 AI, 8 AO, 32 DI, 32 DO) communicate with the main unit over an internal K-bus.

The process station contains a web server for remote connection and user intervention. The web pages are created in Domat HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Domat IDE.

State of inputs and outputs of each module, system status, runtime operation and power supply condition is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

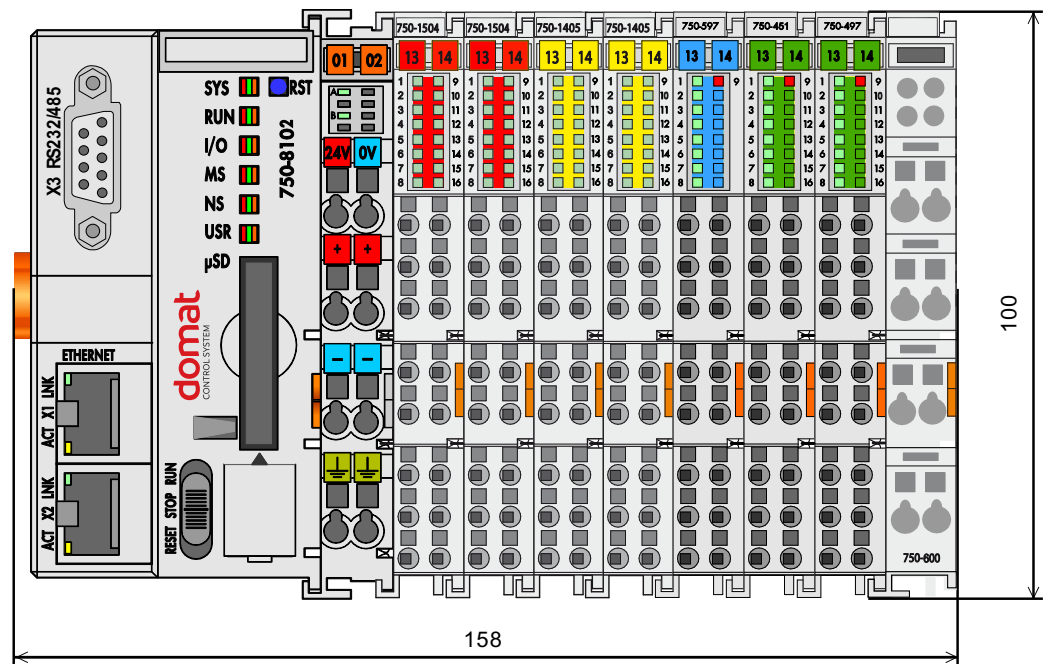
See *domat – Technical application notes* for connection examples.

## Technical data

|                          |                                                                                                                                                                                                                                                                               |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (–25...+30 %), 5.3 W, cage clamp type terminals                                                                                                                                                                                                                       |
| Operating temperature    | 0...55 °C                                                                                                                                                                                                                                                                     |
| Max. admissible humidity | 95 %                                                                                                                                                                                                                                                                          |
| <b>PLC:</b>              |                                                                                                                                                                                                                                                                               |
| Type                     | 750-8102                                                                                                                                                                                                                                                                      |
| CPU                      | Cortex A8, 600 MHz                                                                                                                                                                                                                                                            |
| Memory                   | 256 MB RAM, 64 kB NVRAM                                                                                                                                                                                                                                                       |
| Memory card              | unsupported, not intended to be used by user                                                                                                                                                                                                                                  |
| Addressing               | SW or by DIP switches                                                                                                                                                                                                                                                         |
| <b>Communication:</b>    |                                                                                                                                                                                                                                                                               |
| Ethernet                 | 2 × Ethernet 10/100, RJ45                                                                                                                                                                                                                                                     |
|                          | 2 × signalling LEDs (Link, Data) part of the Ethernet connector                                                                                                                                                                                                               |
| Programming enviroment   | Domat IDE ver. 2:4:0:x or later (ST, FBD)                                                                                                                                                                                                                                     |
| Terminals                | cage clamp terminals - wire 0.08...2.5 mm <sup>2</sup>                                                                                                                                                                                                                        |
| Analogue inputs          | <p>8 × Pt 1000, resistance 0...1200 Ohm, 0...5000 Ohm, 16 bit resolution</p> <p>(other measuring ranges, like Pt100, Ni1000 etc. can be recalculated using predefined transformations in the Merbon program)</p> <p>8 × voltage 0...10 V DC / ±10 V DC, 12 bit resolution</p> |
| Analogue outputs         | 8 × 0...10 / ±10 V DC                                                                                                                                                                                                                                                         |
| Load impedance           | ≥ 2 kΩ                                                                                                                                                                                                                                                                        |
| Digital inputs           | 32 × 24 V DC – need to connect DC voltage, e.g. that from the power supply                                                                                                                                                                                                    |
| Input voltage „log. 0“   | max. 5 V DC, 1.6 mA                                                                                                                                                                                                                                                           |
| Input voltage „log. 1“   | max. 30 V DC, 4.3...4.6 mA                                                                                                                                                                                                                                                    |

|                      |                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------|
| Digital outputs      | 32 × semiconductor, NO: 0.5 A / 24 V DC, 1 kHz                                                                 |
| Dimensions           | 71.9 (h) × 158 (w) × 100 (h) mm                                                                                |
| Weight               | approx. 525 g                                                                                                  |
| Protection degree    | IP20                                                                                                           |
| Material             | polycarbonate, polyamide 6.6                                                                                   |
| Standards conformity | electromagnetic compatibility (EMC) EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

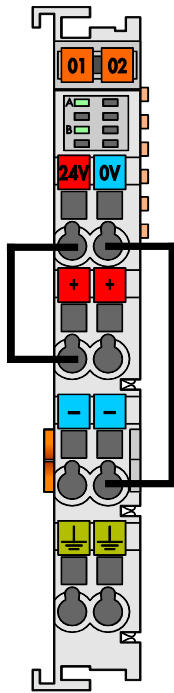
## Dimensions and connection



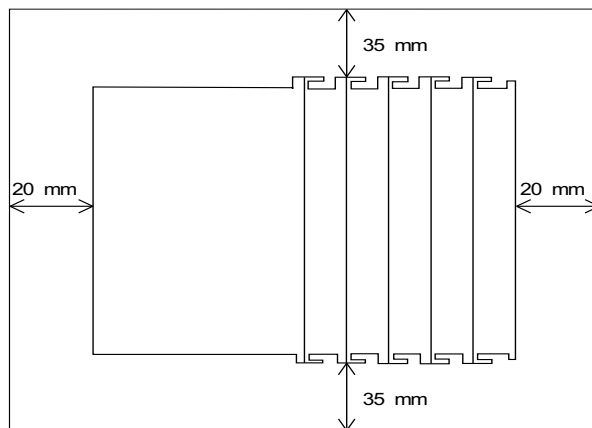
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image below).



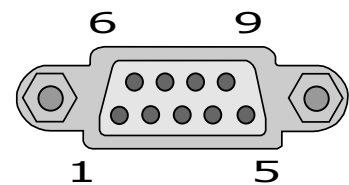
During the installation, ensure sufficient distance of controller assembly from other components:



## Serial port

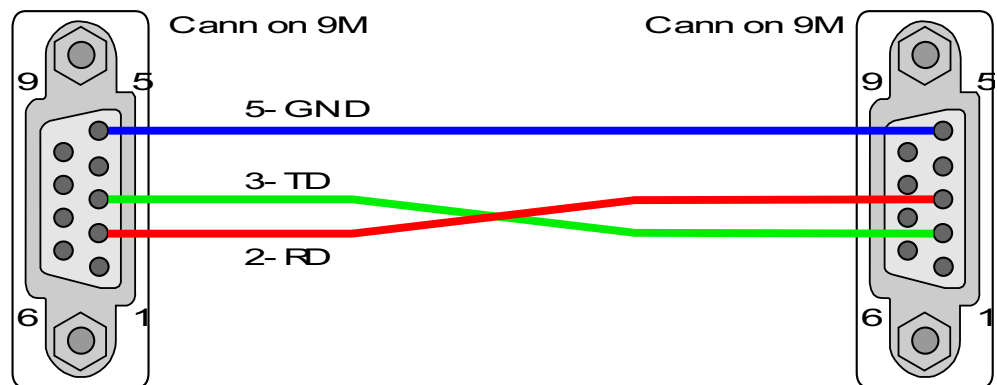
wMXcom controller has serial interface with Cannon 9F connector, which can be used as RS-232 or as RS-485. This can be set in Domat IDE.

Voltage levels for RS-232 and RS-485 are different! Ensure correct setting and connection.



| Pin       | RS-232    |                 | RS-485     |                         |
|-----------|-----------|-----------------|------------|-------------------------|
| 1         | NC        | Not assigned    | NC         | Not assigned            |
| 2         | RxD (out) | Receive data    | NC         | Not assigned            |
| 3         | TxD (in)  | Transmit data   | A (Tx/Rx+) | Transmit/receive data + |
| 4         | NC        | Not assigned    | NC         | Not assigned            |
| 5         | FB_GND    | Ground          | FB_GND     | Ground                  |
| 6         | NC        | Not assigned    | FB_5V      | Power supply            |
| 7         | RTS (in)  | Request to send | NC         | Not assigned            |
| 8         | CTS (out) | Clear to send   | B (Tx/Rx-) | Transmit/receive data - |
| 9         | NC        | Not assigned    | NC         | Not assigned            |
| Enclosure | Shield    | Shielding       | Shield     | Shielding               |

For connection of GSM modem to build-in RS232 port the null-modem M-M cable (2-3, 3-2, 5-5) should be used.



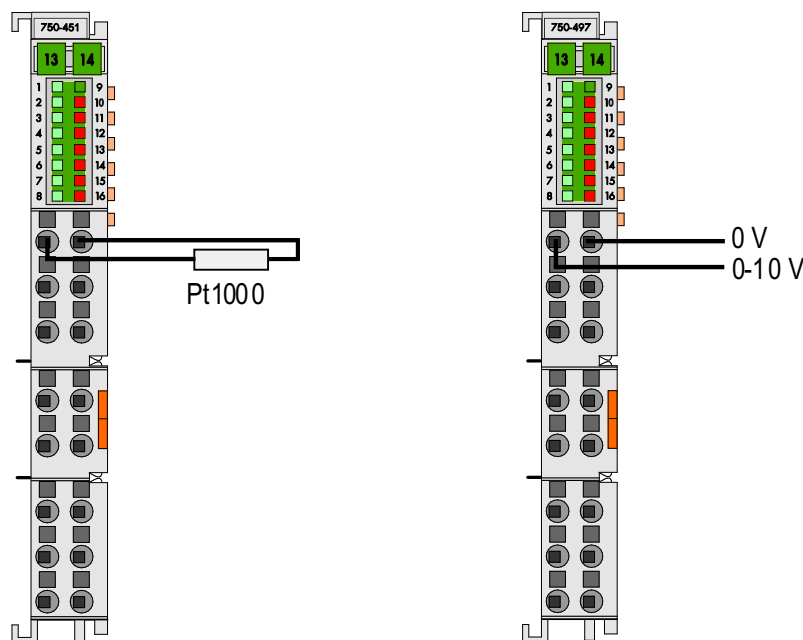
Controller is made from PLC: [PFC100 \(750-8102\)](#) and modules: [750-1504](#), [750-1405](#), [750-597](#), [750-451](#), [750-497](#), [750-600](#).

## Analogue inputs

Analogue input module **750-451** has fixed resistance measurement at 8 inputs.

Analogue input module **750-497** has fixed input voltage measurement (8 inputs, range 0...10 V).

See connection schemes (two-wire connection):



Operational readiness and trouble-free data bus communication of each input is **indicated** by green LED. For the 750-497 module, red LED indicates when measuring range is exceeded or falls below its limit for a given input. For the 750-451 module, red LED indicates wire break, short circuit or when signal is out of measuring range.

For accuracy of measurement see table in complete specification datasheet.

Complete specification of module is stated in particular datasheet:

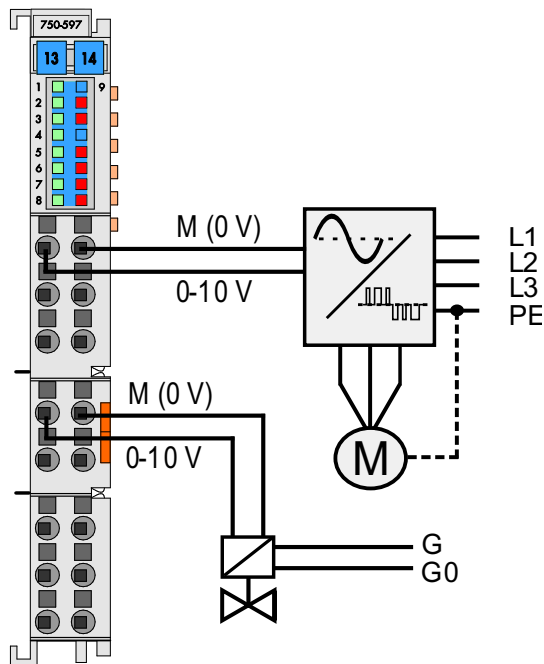
[w750-451](#)

[w750-497](#)

## Analogue outputs

Analogue output module **750-597** (8 AO) provide 0...10 V DC (or  $\pm 10$  V). Output signal is galvanically insulated and will be transmitted with a resolution of 12 bits. Measurement error is 0.1 % from the measuring range.

All outputs have common ground M (terminals 9...16), which is connected to the module minus terminal by common contact.



Operational readiness and trouble-free data bus communication of each channel is **indicated** by green LED. Red LED indicates status of the field power supply voltage (undervoltage or general error).

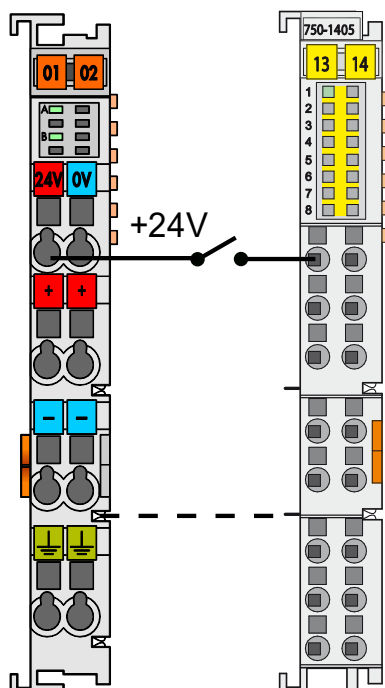
Complete specification of module is stated in particular datasheet:

[w750-597](#)

## Digital inputs

Digital inputs module **750-1405** has 16 input channels (24 V DC, 3 ms). Inputs can be powered by the same power supply as wMX controller. Voltage levels are: -3 V...+5 V for logical zero and +11 V...+30 V for logical one.

Digital inputs are connected according this schema (two-wire connection):



Dashed line is via PLC internal bus.

Switched state of each input is **indicated** by green LED (lit = logical one detected).

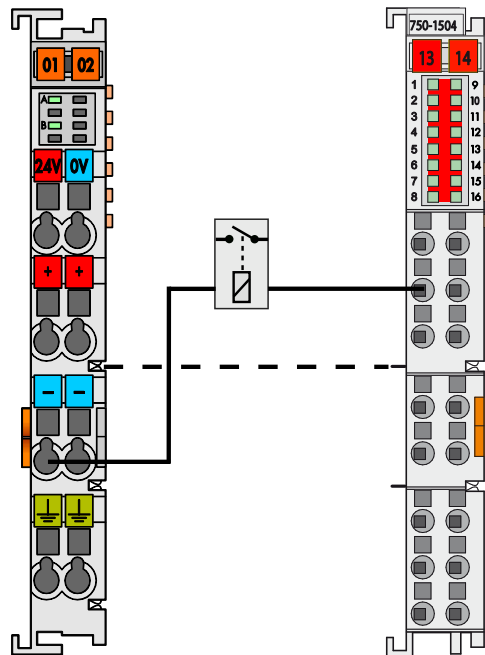
Complete specification of module is stated in particular datasheet:

[w750-1405](#)

### Digital outputs

Digital outputs module **750-1504** has 16 output channels (24 V DC, 0.5 A, short-circuit protected, 1 kHz).

See scheme below for connection:



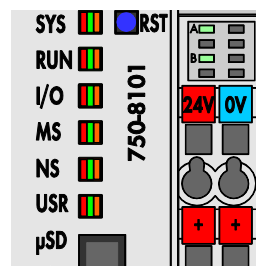
The dashed line is connected via the PLC internal bus.

Switched status of each output is indicated by the green LED in upper part of the module.

Complete specification of module is stated in particular datasheet:

[w750-1504](#)

### LED indication



Red/ green/ orange LED (blink):

SYS – system status

RUN – runtime is running

I/O – bus status (not used)

MS – module status (not used)

NS – not used

USR – user programmable

green LED:

uSD – SD card status (blinks during writing on card)

A – state of supply voltage (still)

B – state of I/O modules supply voltage (still)

|          |                                                                                   |                                                                                                                                                                                                                                                                                                                           |
|----------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Switches | RST                                                                               | Reset button - unused                                                                                                                                                                                                                                                                                                     |
|          | RESET STOP RUN                                                                    | Turning this switch in RUN position, will start runtime. Turning the switch in STOP position will stop runtime. In this position is not possible to deploy and run solution.<br>Holding switch in RESET position for 2-7 seconds will cause warm restart. Holding for time longer than 7 seconds will cause cold restart. |
|          |  |                                                                                                                                                                                                                                                                                                                           |
|          | Address                                                                           | SW address                                                                                                                                                                                                                                                                                                                |

## Others

### Internal Kbus addressing

For each module a position corresponding to the physical position in assembly is given to the module. E.g. first module after controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image in *Dimensions and connection*).

You can find complete specification of each device at [www.wago.com](http://www.wago.com).

**Programming** The main programming tool is the Domat package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Domat IDE). The Domat package contains also LCD menu editor as well as web editor (Domat HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

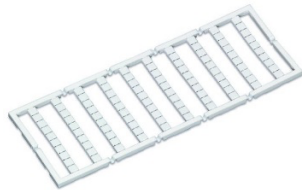
**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT104/200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

## Accessories

### Mini-WSB marking card (247-513)

- snap-on type
- horizontal markings of each module



## Fieldbus connector PROFIBUS (750-960)



### **Safety note**

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

### **Cyber security note**

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

01/2020 – First datasheet version.

12/2021 – GSM modem connection to RS232 info added.

02/2022 – Logo change, stylistic modifications, added information about limiting the number of connected clients.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

05/2022 – Memory size update.

08/2022 – Stylistic modifications (list of modules, order number).

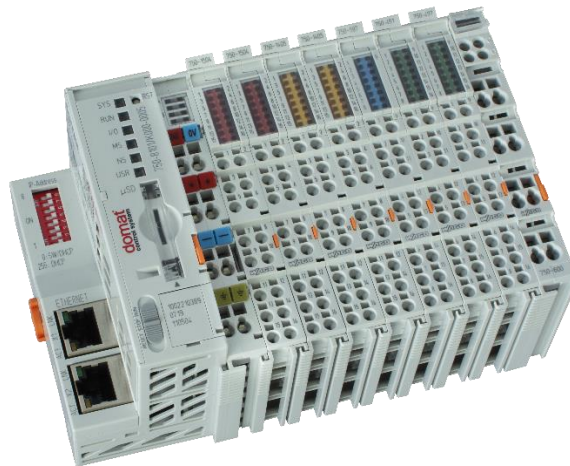
04/2023 – SD card slot function specified.

04/2024 – Cyber security note added, change of names from Merbon to Domat..

order number

**wMX**

**DDC controller**



#### Summary

DDC (Direct digital control) controller wMX is a compact PLC with Merbon RT. The controller contains two Ethernet ports and a datapoint mix of 16 AI, 32 DI, 8 AO and 32 DO. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O modules within the 750/753 series.

#### Application

- Freely programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

#### Function

Controller wMX has twin-port Ethernet interface and thanks to integrated switch it is able to create bus topology.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Merbon IDE
- Direct connection of I/O modules
- 2 × Ethernet (configurable)
- Operating system Linux
- Maintenance free / Low maintenance

The application is created and uploaded in the Merbon IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

IO modules (16 AI, 8 AO, 32 DI, 32 DO) communicate with the main unit over an internal K-bus.

The process station contains a web server for remote connection and user intervention. The web pages are created in Merbon HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Merbon IDE.

State of inputs and outputs of each module, system status, runtime operation and power supply condition is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

See *domat – Technical application notes* for connection examples.

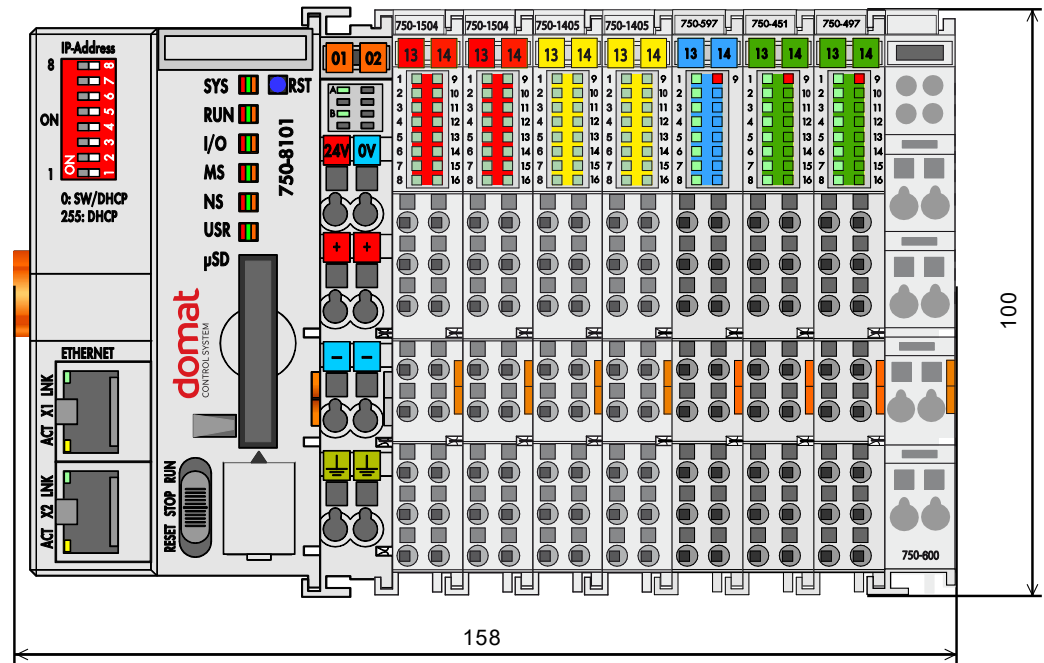
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## Technical data

|                          |                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (-25...+30 %), 5.3 W, cage clamp type terminals                                                                                                                                                                                                                |
| Operating temperature    | 0...55 °C                                                                                                                                                                                                                                                              |
| Max. admissible humidity | 95 %                                                                                                                                                                                                                                                                   |
| <b>PLC:</b>              |                                                                                                                                                                                                                                                                        |
| Type                     | 750-8101                                                                                                                                                                                                                                                               |
| CPU                      | Cortex A8, 600 MHz                                                                                                                                                                                                                                                     |
| Memory                   | 256 MB RAM, 6 kB NVRAM                                                                                                                                                                                                                                                 |
| Memory card              | microSD up to 32 GB<br>(push/push type slot, cover possible to seal)                                                                                                                                                                                                   |
| Addressing               | SW or by DIP switches                                                                                                                                                                                                                                                  |
| <b>Communication:</b>    |                                                                                                                                                                                                                                                                        |
| Ethernet                 | 2 × Ethernet 10/100, RJ45<br><br>2 × signalling LEDs (Link, Data) part of the Ethernet connector                                                                                                                                                                       |
| Programming enviroment   | Merbon IDE ver. 2:4:0:x or later (ST, FBD)                                                                                                                                                                                                                             |
| Terminals                | cage clamp terminals - wire 0.08...2.5 mm <sup>2</sup>                                                                                                                                                                                                                 |
| Analogue inputs          | 8 × Pt 1000, resistance 0...1200 Ohm, 0...5000 Ohm, 16 bit resolution<br><br>(other measuring ranges, like Pt100, Ni1000 etc. can be recalculated using predefined transformations in the Merbon program)<br><br>8 × voltage 0...10 V DC / ±10 V DC, 12 bit resolution |
| Analogue outputs         | 8 × 0...10 / ±10 V DC                                                                                                                                                                                                                                                  |
| Load impedance           | ≥ 2 kΩ                                                                                                                                                                                                                                                                 |
| Digital inputs           | 32 × 24 V DC – need to connect DC voltage, e.g. that from the power supply                                                                                                                                                                                             |
| Input voltage „log. 0“   | max. 5 V DC, 1.6 mA                                                                                                                                                                                                                                                    |

|                        |                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Input voltage „log. 1“ | max 30 V DC, 4.3...4.6 mA                                                                                     |
| Digital outputs        | <b>32</b> × semiconductor, NO: 0.5 A / 24 V DC, 1 kHz                                                         |
| Dimensions             | 71.9 (h) × 158 (w) × 100 (h) mm                                                                               |
| Weight                 | approx. 525 g                                                                                                 |
| Protection degree      | IP20                                                                                                          |
| Material               | polycarbonate, polyamide 6.6                                                                                  |
| Standards conformity   | electromagnetic compatibility (EMC)EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

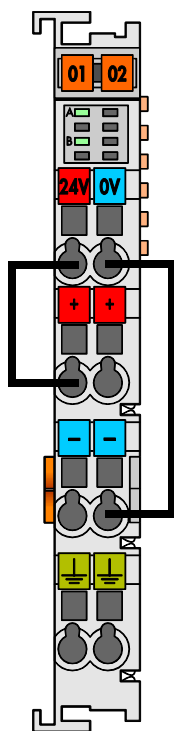
## Dimensions and connection



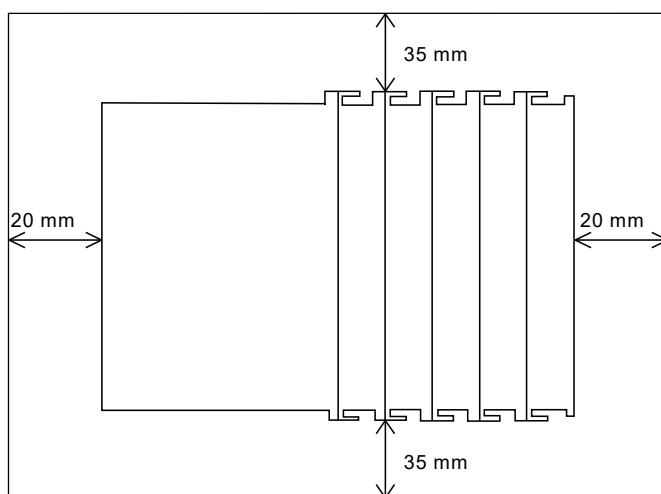
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **0V** terminals on the power module (see image below).



During the installation, ensure sufficient distance of controller assembly from other components:



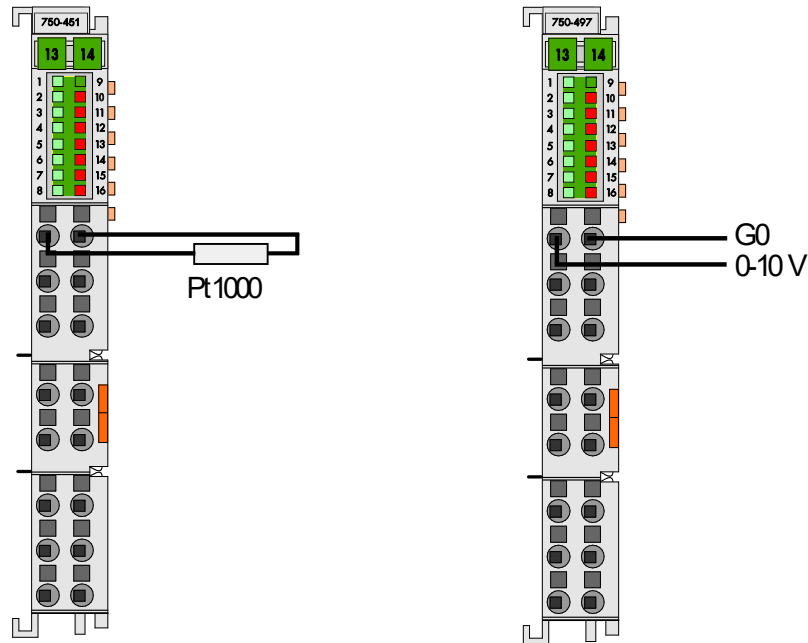
Controller is made from PLC: [PFC100 \(750-8101\)](#) and modules: [750-1504](#), [750-1405](#), [750-597](#), [750-451](#), [750-497](#), [750-600](#).

## Analogue inputs

Analogue input module **750-451** has fixed resistance measurement at 8 inputs.

Analogue input module **750-497** has fixed input voltage measurement (8 inputs, range 0...10 V).

See connection schemes (two-wire connection):



Operational readiness and trouble-free data bus communication of each input is **indicated** by green LED. For the 750-497 module, red LED indicates when measuring range is exceeded or falls below its limit for a given input. For the 750-451 module, red LED indicates wire break, short circuit or when signal is out of measuring range.

For accuracy of measurement see table in complete specification datasheet.

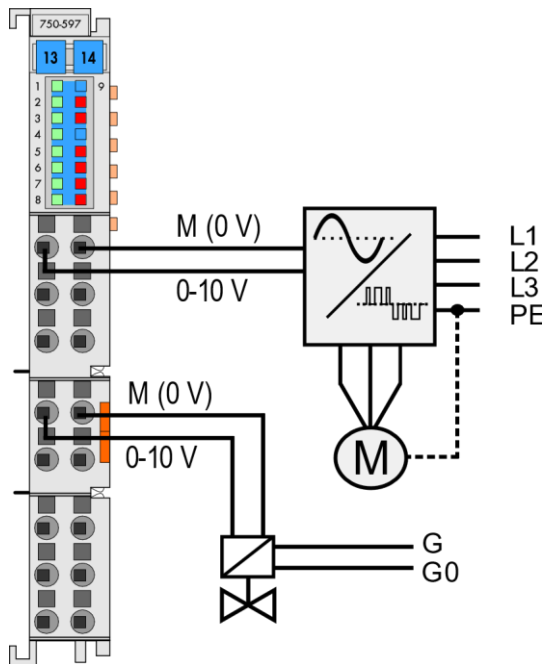
Complete specification of module is stated in particular datasheet:

[w750-451](#)

[w750-497](#)

## Analogue outputs

Analogue output module **750-597** (8 AO) provide 0...10 V DC (or  $\pm 10$  V). Output signal is galvanically insulated and will be transmitted with a resolution of 12 bits. Measurement error is 0.1 % from the measuring range. All outputs have common ground M (terminals 9...16), which is connected to the module minus terminal by common contact.



Operational readiness and trouble-free data bus communication of each channel is **indicated** by green LED. Red LED indicates status of the field power supply voltage (undervoltage or general error).

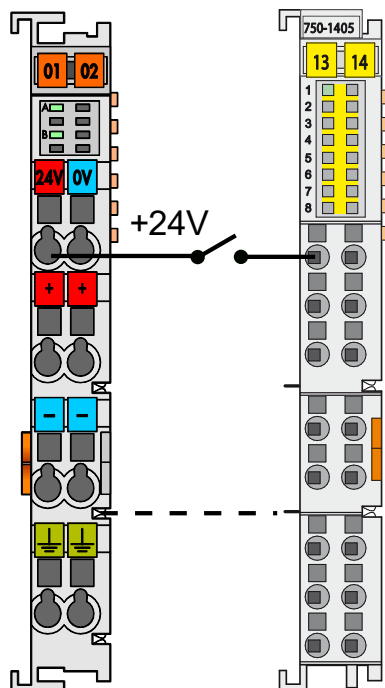
Complete specification of module is stated in particular datasheet:

[w750-597](#)

## Digital inputs

Digital inputs module **750-1405** has 16 input channels (24 V DC, 3 ms). Inputs can be powered by the same power supply as wMX controller. Voltage levels are: -3 V...+5 V for logical zero and +11 V...+30 V for logical one.

Digital inputs are connected according this schema (two-wire connection):

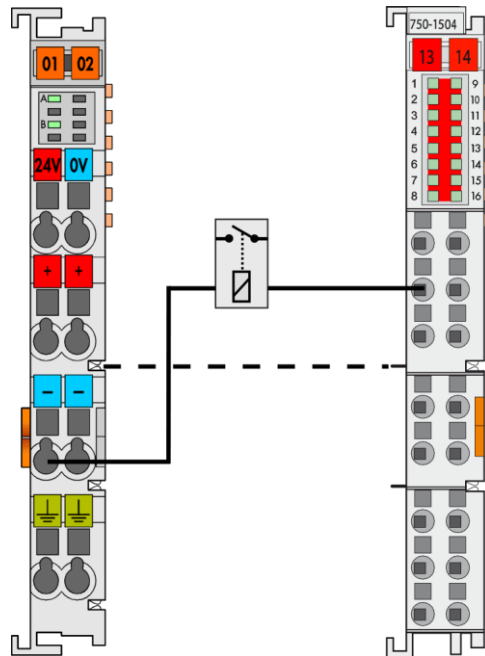


Dashed line is via PLC internal bus.

Switched state of each input is **indicated** by green LED (lit = logical one detected).

Complete specification of module is stated in particular datasheet:  
[w750-1405](#)

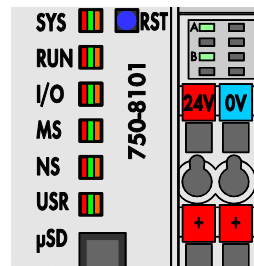
**Digital outputs** Digital outputs module **750-1504** has 16 output channels (24 V DC, 0.5 A, short-circuit protected, 1 kHz).  
 See scheme below for connection:



The dashed line is connected via the PLC internal bus.  
 Switched status of each output is indicated by the green LED in upper part of the module.

Complete specification of module is stated in particular datasheet:  
[w750-1504](#)

#### LED indication



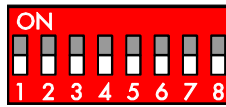
Red/ green/ orange LED (blink):  
 SYS – system status  
 RUN – runtime is running  
 I/O – bus status (not used)  
 MS – module status (not used)  
 NS – not used  
 USR – user programmable  
 green LED:  
 uSD – SD card status (blinks during writing on card)

#### Switches



A – state of supply voltage (still)  
 B – state of I/O modules supply voltage (still)  
 Reset button - unused  
 Turning this switch in RUN position, will start runtime. Turning the switch in STOP position will stop runtime. In this position is not possible to deploy and run solution.  
 Holding switch in RESET position for 2-7 seconds will cause warm restart. Holding for time longer than 7 seconds will cause cold restart.

**Address** By DIP switches the IP address can be set:  
0 – default address / SW address  
1...254 – fixed address (192.168.1.1...254)  
255 – DHCP



## Others

### Internal Kbus addressing

For each module a position corresponding to the physical position in assembly is given to the module. E.g. first module after controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **0V** terminals on the power module (see image in *Dimensions and connection*).

You can find complete specification of each device at [www.wago.com](http://www.wago.com).

## Programming

The main programming tool is the Merbon package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Merbon IDE). The Merbon package contains also LCD menu editor as well as web editor (Merbon HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

**Number of connections from SSCP clients is max. 20.** This includes connections from Merbon IDE, Merbon SCADA, HT104/200, mobile application Merbon Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Merbon IDE reserves two SSCP TCP connections.

## Accessories

### Mini-WSB marking card (247-513)

- snap-on type
- horizontal markings of each module



## Safety note

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Changes in  
versions**

01/2020 – First datasheet version.

12/2021 – Module datasheets links update, stylistic adjustments.

02/2022 – Logo change, stylistic modifications, added information about limiting the number of connected clients.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

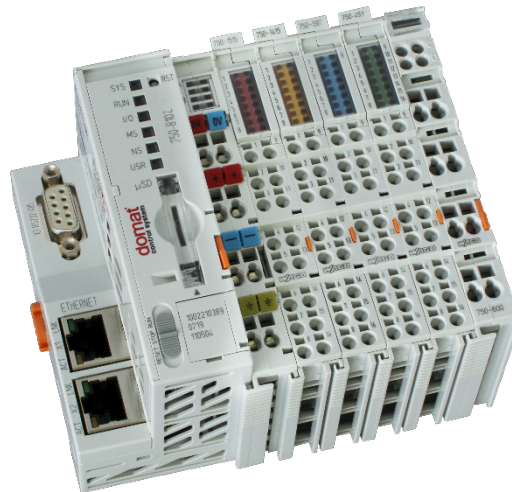
05/2022 – Memory size update.

08/2022 – Stylistic modifications (list of modules, order number).

order number

**wCIOcom**

**DDC controller**



#### Summary

DDC (Direct digital control) controller wCIOcom is a compact PLC with Domat RT. The controller contains two Ethernet ports, serial port and a datapoint mix of 8 AI, 8 DI, 8 AO and 8 DO. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O modules within the 750/753 series.

#### Application

- Freely programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

#### Function

The main unit has a twin-port Ethernet interface and thanks to its integrated switch it is able to connect more PLCs in a line topology.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Domat IDE
- Direct connection of I/O modules
- 2× Ethernet (configurable)
- Operating system Linux
- Maintenance free / Low maintenance

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

IO modules (8 AI, 8 AO, 8 DI, 8 DO) communicate with the main unit over an internal K-bus.

The process station contains a web server for remote connection and user intervention. The web pages are created in Domat HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Domat IDE.

State of inputs and outputs of each module, system status, runtime operation and power supply condition is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

See *domat – Technical application notes* for connection examples.

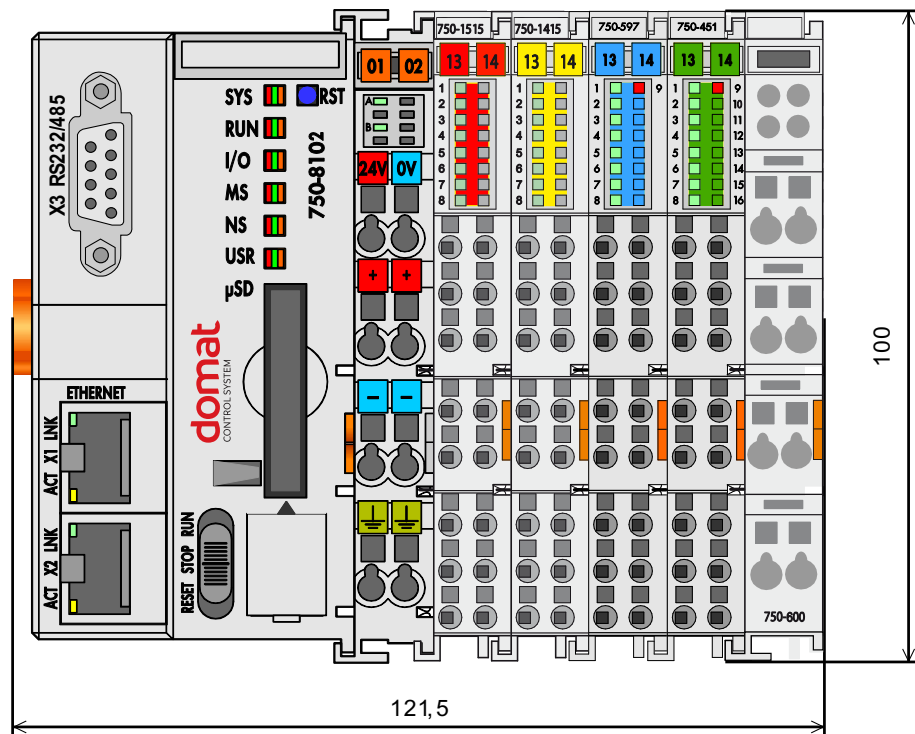
---

## Technical data

|                          |                                                                                                                                                                                                                                                                       |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (–25...+30 %), 4 W, cage clamp type terminals                                                                                                                                                                                                                 |
| Operating temperature    | 0...55 °C                                                                                                                                                                                                                                                             |
| Max. admissible humidity | 95 %                                                                                                                                                                                                                                                                  |
| <b>PLC:</b>              |                                                                                                                                                                                                                                                                       |
| Type                     | 750-8102                                                                                                                                                                                                                                                              |
| CPU                      | Cortex A8, 600 MHz                                                                                                                                                                                                                                                    |
| Memory                   | 256 MB RAM, 64 kB NVRAM                                                                                                                                                                                                                                               |
| Memory card              | unsupported, not intended to be used by user                                                                                                                                                                                                                          |
| Addressing               | SW or by DIP switches                                                                                                                                                                                                                                                 |
| <b>Communication:</b>    |                                                                                                                                                                                                                                                                       |
| Ethernet                 | 2 × Ethernet 10/100, RJ45<br><br>2 × signalling LEDs (Link, Data) part of the Ethernet connector                                                                                                                                                                      |
| Serial port              | RS232/485                                                                                                                                                                                                                                                             |
| Programming environment  | Domat IDE ver. 2:4:0:x or later (ST, FBD)                                                                                                                                                                                                                             |
| Terminals                | cage clamp terminals - wire 0.08...2.5 mm <sup>2</sup>                                                                                                                                                                                                                |
| Analogue inputs          | 8 × Pt 1000, resistance 0...1200 Ohm, 0...5000 Ohm, 16 bit resolution<br><br>(other measuring ranges, like Pt100, Ni1000 etc. can be recalculated using predefined transformations in the Domat program)<br><br>8 × voltage 0...10 V DC / ±10 V DC, 12 bit resolution |
| Analogue outputs         | 8 × 0...10 / ±10 V DC                                                                                                                                                                                                                                                 |
| Load impedance           | ≥ 2 kΩ                                                                                                                                                                                                                                                                |
| Digital inputs           | 8 × 24 V DC – need to connect DC voltage, e.g. that from the power supply                                                                                                                                                                                             |
| Input voltage „log. 0“   | max. 5 V DC, 1.6 mA                                                                                                                                                                                                                                                   |

|                        |                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Input voltage „log. 1“ | max. 30 V DC, 4.3...4.6 mA                                                                                    |
| Digital outputs        | 8× semiconductor, NO: 0.5 A /24 V DC, 1 kHz                                                                   |
| Dimensions             | 71.9 (h) × 121.5 (w) × 100 (h) mm                                                                             |
| Weight                 | approx. 380 g                                                                                                 |
| Protection degree      | IP20                                                                                                          |
| Material               | polycarbonate, polyamide 6.6                                                                                  |
| Standards conformity   | electromagnetic compatibility (EMC)EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

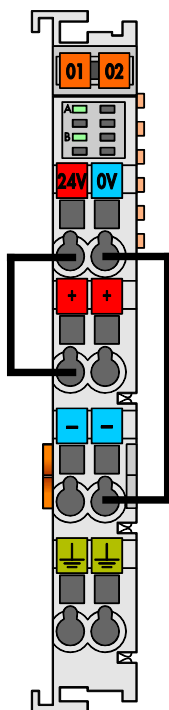
## Dimensions and connection



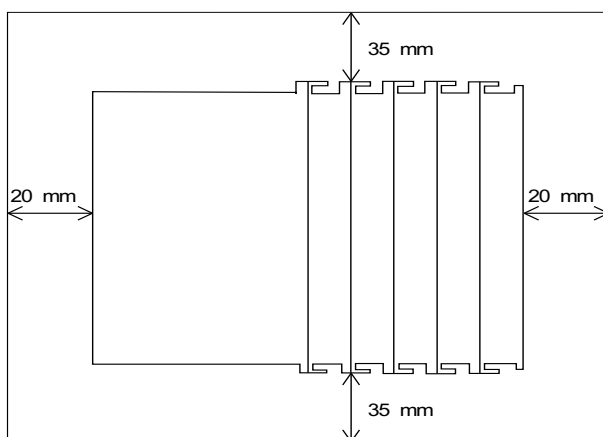
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image below).



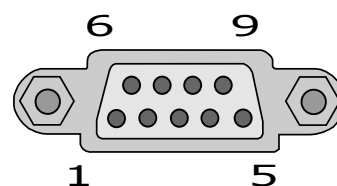
During the installation, ensure sufficient distance of controller assembly from other components:



## Serial port

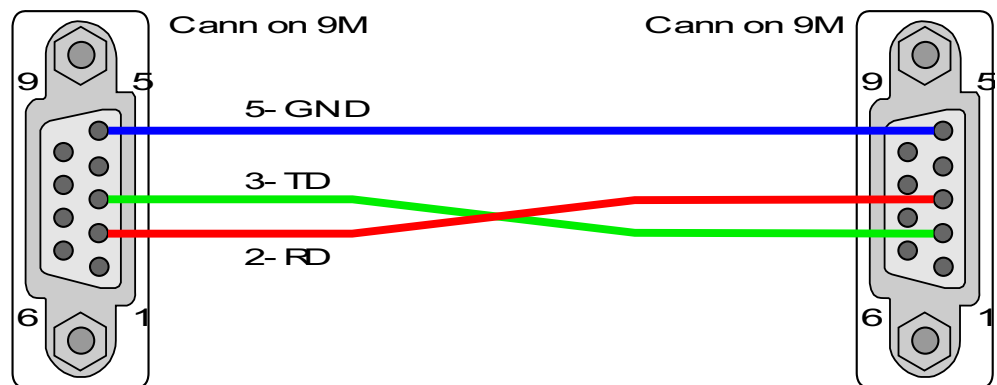
wCIOcom controller has serial interface with Cannon 9F connector, which can be used as RS-232 or as RS-485. This can be set in Domat IDE.

Voltage levels for RS-232 and RS-485 are different!  
Ensure correct setting and connection.



| Pin       | RS-232    |                 | RS-485     |                         |
|-----------|-----------|-----------------|------------|-------------------------|
| 1         | NC        | Not assigned    | NC         | Not assigned            |
| 2         | RxD (out) | Receive data    | NC         | Not assigned            |
| 3         | TxD (in)  | Transmit data   | A (Tx/Rx+) | Transmit/receive data + |
| 4         | NC        | Not assigned    | NC         | Not assigned            |
| 5         | FB_GND    | Ground          | FB_GND     | Ground                  |
| 6         | NC        | Not assigned    | FB_5V      | Power supply            |
| 7         | RTS (in)  | Request to send | NC         | Not assigned            |
| 8         | CTS (out) | Clear to send   | B (Tx/Rx-) | Transmit/receive data - |
| 9         | NC        | Not assigned    | NC         | Not assigned            |
| Enclosure | Shield    | Shielding       | Shield     | Shielding               |

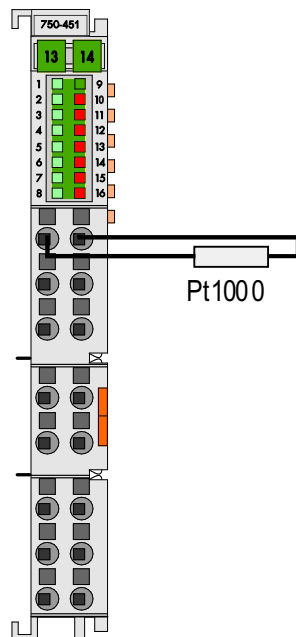
For connection of GSM modem to build-in RS232 port the null-modem M-M cable (2-3, 3-2, 5-5) should be used.



Controller is made from PLC: [PFC100 \(750-8102\)](#) and modules: [750-1515](#), [750-1415](#), [750-597](#), [750-451](#) a [750-600](#).

### Analogue inputs

Analogue input module **750-451** has fixed resistance measurement at 8 inputs. See connection scheme (two-wire connection):

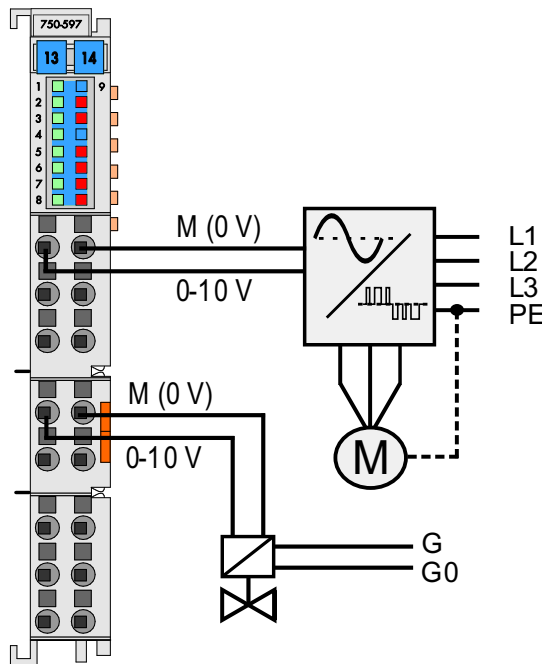


Operational readiness and trouble-free data bus communication of each input is **indicated** by green LED. Red LED indicates wire break, short circuit or signal out of its measuring range. For accuracy of measurement see table in complete specification datasheet.

Complete specification of module is stated in particular datasheet: [w750-451](#)

### Analogue outputs

Analogue output module **750-597** (8 AO) provides 0...10 V DC output. The output signal is galvanically insulated, with resolution of 12 bits. Measurement error is 0.1 % from the measuring range. All outputs have common ground M (terminals 9...16), which is connected to the module minus terminal by common contact.



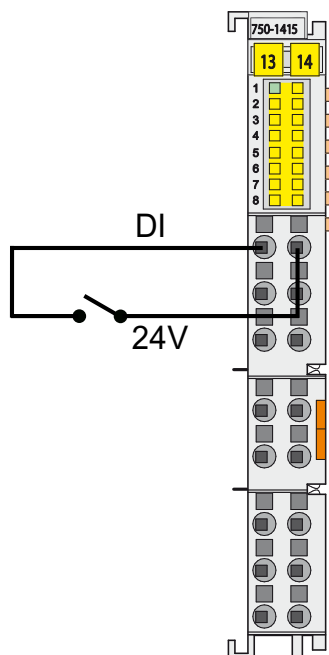
Operational readiness and trouble-free data bus communication of each channel is **indicated** by green LED. Red LED indicates status of the field power supply voltage (undervoltage or general error).

Complete specification of module is stated in particular datasheet:  
[w750-597](#)

### Digital inputs

Digital inputs module **750-1415** has 8 input channels (24 V DC, 3 ms) and operate with 24 V DC voltage. This voltage is brought to the terminals 9...16. Inputs are galvanically separated from the other modules or controller and can be powered by controller power supply. Voltage levels are -3 V...+5 V for False and +11 V...+30 V for True.

Digital inputs are connected according to this scheme (two-wire connection):



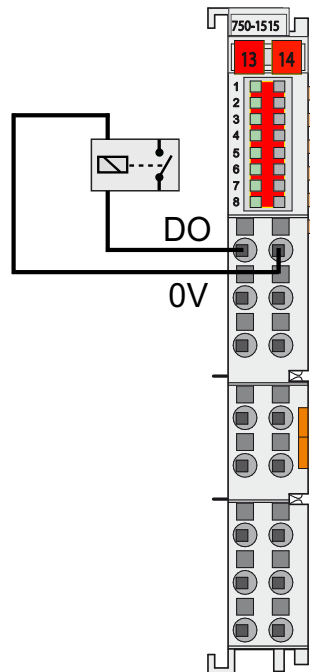
Active state of each input is **indicated** by green LED (on = logical one detected).

Complete specification of module is stated in particular datasheet:

[w750-1415](#)

## Digital outputs

Digital outputs module **750-1515** has 8 output channels (24 V DC, 0.5 A, short-circuit protected, 1 kHz). See scheme below for connection:

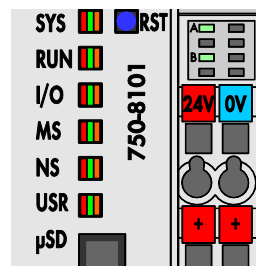


Switched status of each output is indicated by a green LED in the upper part of the module.

Complete specification of module is stated in particular datasheet:

[w750-1515](#)

## LED indication



Red/ green/ orange LED (blink):

SYS – system status

RUN – runtime is running

I/O – bus status (not used)

MS – module status (not used)

NS – not used

USR – user programmable

green LED:

uSD – SD card status (blinks during writing on card)

A – state of supply voltage (still)

B – state of I/O modules supply voltage (still)

Reset button - unused

## Switches

RST

RESET STOP RUN



Address

Switch in RUN position starts the runtime. Turning the switch in STOP position stops the runtime. In this position it is not possible to deploy and run solution.

Holding switch in the RESET position for 2-7 seconds causes warm restart. Holding RESET for longer than 7 seconds invokes cold restart.

SW address

## Others

### Internal K-bus addressing

For each module a position corresponding to the physical position in assembly is given to the module. E.g. first module after controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image in *Dimensions and connection*).

You can find complete specification of each device at [www.wago.com](http://www.wago.com).

## Programming

The main programming tool is the Domat package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Domat IDE). The Domat package contains also LCD menu editor as well as web editor (Domat HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

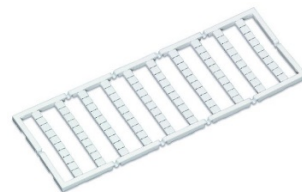
**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT104/200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

## Accessories

### Mini-WSB marking card (247-513)

- snap-on type
- horizontal markings of each module



### Fieldbus connector PROFIBUS (750-960)



## Safety note

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Cyber security note**

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

01/2020 – First datasheet version.

12/2021 – GSM modem connection to RS232 info added, Styl

02/2022 – Logo change, stylistic modifications, added information about limiting the number of connected clients.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

05/2022 – Memory size update.

08/2022 – Stylistic modifications (list of modules, order number).

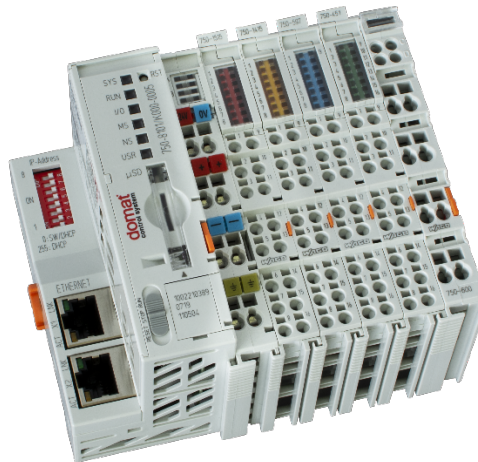
04/2023 – SD card slot function specified.

08/2023 – Change of names from Merbon to Domat.

order number

**wCIO**

**DDC controller**



#### Summary

DDC (Direct digital control) controller wCIO is a compact PLC with Domat RT. The controller contains two Ethernet ports and a datapoint mix of 8 AI, 8 DI, 8 AO and 8 DO. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O modules within the 750/753 series.

#### Application

- Freely programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

#### Function

The main unit has a twin-port Ethernet interface and thanks to its integrated switch it is able to connect more PLCs in a line topology.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Domat IDE
- Direct connection of I/O modules
- 2 × Ethernet (configurable)
- Operating system Linux
- Maintenance free / Low maintenance

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

IO modules (8 AI, 8 AO, 8 DI, 8 DO) communicate with the main unit over an internal K-bus.

The process station contains a web server for remote connection and user intervention. The web pages are created in Domat HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Domat IDE.

State of inputs and outputs of each module, system status, runtime operation and power supply condition is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

See *domat – Technical application notes* for connection examples.

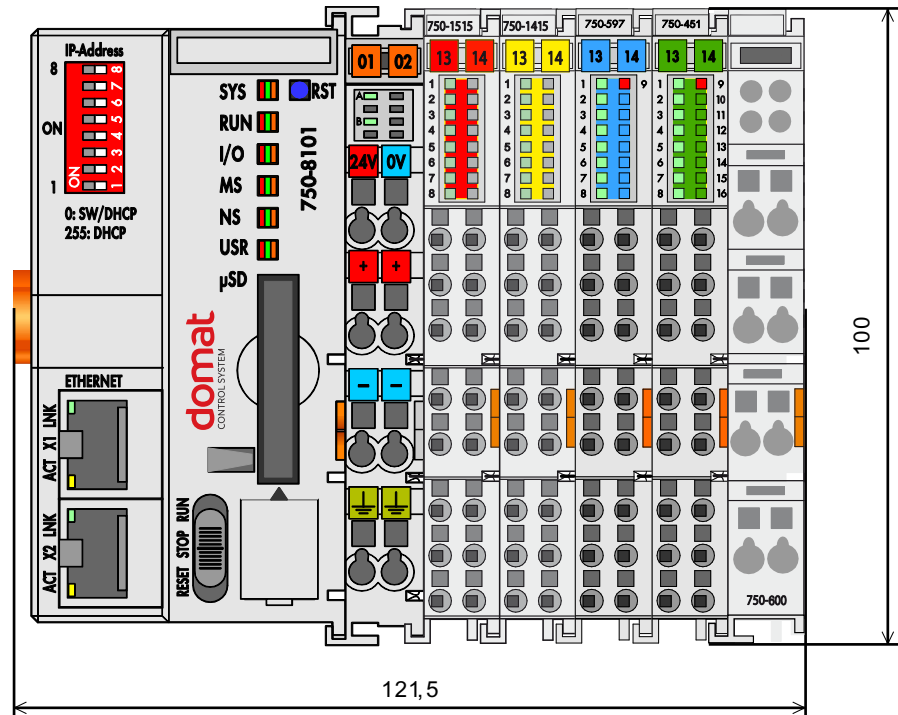
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## Technical data

|                          |                                                                                                                                                                                                                                                                        |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (–25...+30 %), 4 W, cage clamp type terminals                                                                                                                                                                                                                  |
| Operating temperature    | 0...55 °C                                                                                                                                                                                                                                                              |
| Max. admissible humidity | 95 %                                                                                                                                                                                                                                                                   |
| <b>PLC:</b>              |                                                                                                                                                                                                                                                                        |
| Type                     | 750-8101                                                                                                                                                                                                                                                               |
| CPU                      | Cortex A8, 600 MHz                                                                                                                                                                                                                                                     |
| Memory                   | 256 MB RAM, 64 kB NVRAM                                                                                                                                                                                                                                                |
| Memory card              | unsupported, not intended to be used by user                                                                                                                                                                                                                           |
| Addressing               | SW or by DIP switches                                                                                                                                                                                                                                                  |
| <b>Communication:</b>    |                                                                                                                                                                                                                                                                        |
| Ethernet                 | 2 × Ethernet 10/100, RJ45<br><br>2 × signalling LEDs (Link, Data) part of the Ethernet connector                                                                                                                                                                       |
| Programming enviroment   | Domat IDE ver. 2:4:0:x or later (ST, FBD)                                                                                                                                                                                                                              |
| Terminals                | cage clamp terminals-wire 0.08...2.5 mm <sup>2</sup>                                                                                                                                                                                                                   |
| Analogue inputs          | 8 × Pt 1000, resistance 0...1200 Ohm, 0...5000 Ohm, 16 bit resolution<br><br>(other measuring ranges, like Pt100, Ni1000 etc. can be recalculated using predefined transformations in the Domat program)<br><br>8 × voltage 0...10 V DC / ± 10 V DC, 12 bit resolution |
| Analogue outputs         | 8 × 0...10 / ±10 V DC                                                                                                                                                                                                                                                  |
| Load impedance           | >= 2 kΩ                                                                                                                                                                                                                                                                |
| Digital inputs           | 8 × 24 V DC – need to connect DC voltage, e.g. that from the power supply                                                                                                                                                                                              |
| Input voltage „log. 0“   | max. 5 V DC, 1.6 mA                                                                                                                                                                                                                                                    |
| Input voltage „log. 1“   | max. 30 V DC, 4.3...4.6 mA                                                                                                                                                                                                                                             |
| Digital outputs          | 8 × semiconductor, NO: 0.5 A / 24 V DC, 1 kHz                                                                                                                                                                                                                          |

|                      |                                                                                                               |
|----------------------|---------------------------------------------------------------------------------------------------------------|
| Dimensions           | 71.9 (h) × 121.5 (w) × 100 (h) mm                                                                             |
| Weight               | approx. 380 g                                                                                                 |
| Protection degree    | IP20                                                                                                          |
| Material             | polycarbonate, polyamide 6.6                                                                                  |
| Standards conformity | electromagnetic compatibility (EMC)EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

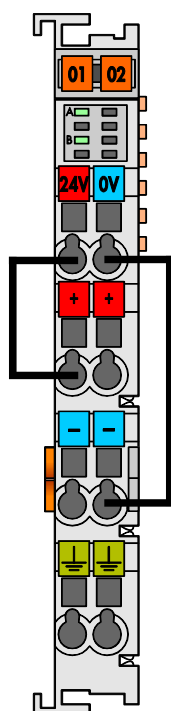
## Dimensions and connection



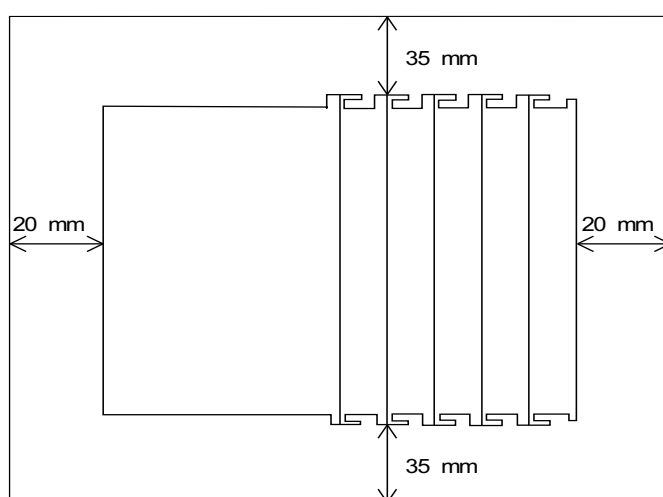
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image below).



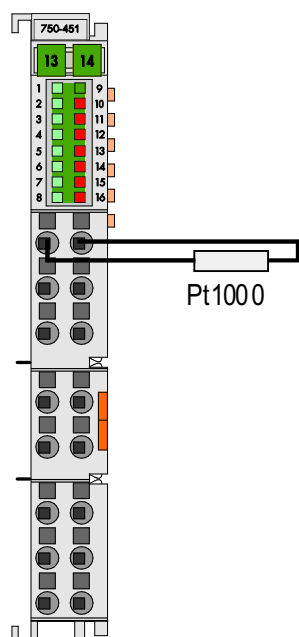
During the installation, ensure sufficient distance of controller assembly from other components:



Controller is made from PLC: [PFC100 \(750-8101\)](#) and modules: [750-1515](#), [750-1415](#), [750-597](#), [750-451](#) a [750-600](#).

### Analogue inputs

Analogue input module **750-451** has fixed resistance measurement at 8 inputs. See connection scheme (two-wire connection):

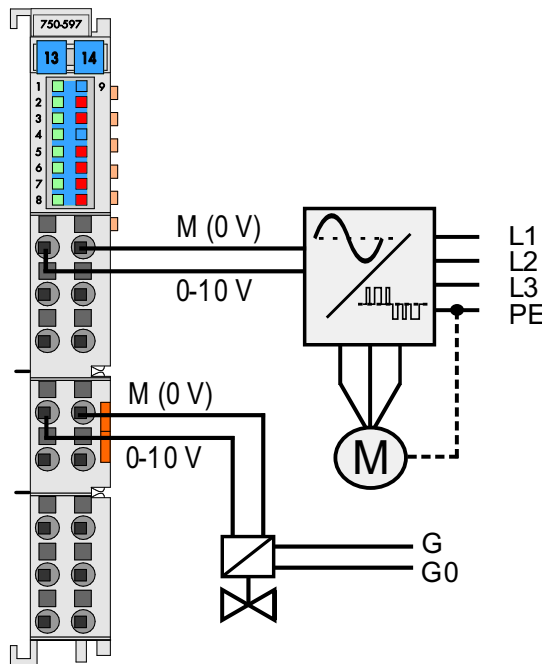


Operational readiness and trouble-free data bus communication of each input is **indicated** by green LED. Red LED indicates wire break, short circuit or signal out of its measuring range.

Complete specification of module is stated in particular datasheet: [w750-451](#)

### Analogue outputs

Analogue output module **750-597** (8 AO) provides 0...10 V DC output. The output signal is galvanically isolated, with resolution of 12 bits. Measurement error is 0.1 % from the measuring range. All outputs have common ground M (terminals 9...16), which is connected to the module minus terminal by common contact.



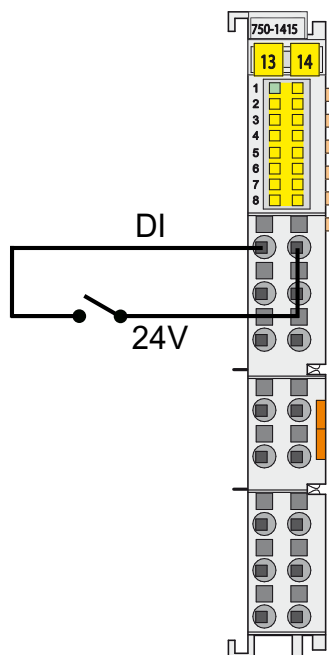
Operational readiness and trouble-free data bus communication of each channel is **indicated** by green LED. Red LED indicates status of the field power supply voltage (undervoltage or general error).

Complete specification of module is stated in particular datasheet:  
[w750-597](#)

### Digital inputs

Digital inputs module **750-1415** has 8 input channels (24 V DC, 3 ms) and operate with 24 V DC voltage. This voltage is brought to the terminals 9...16. Inputs are galvanically separated from the other modules or controller and can be powered by controller power supply. Voltage levels are -3 V...+5 V for False and +11 V...+30 V for True.

Digital inputs are connected according to this scheme (two-wire connection):

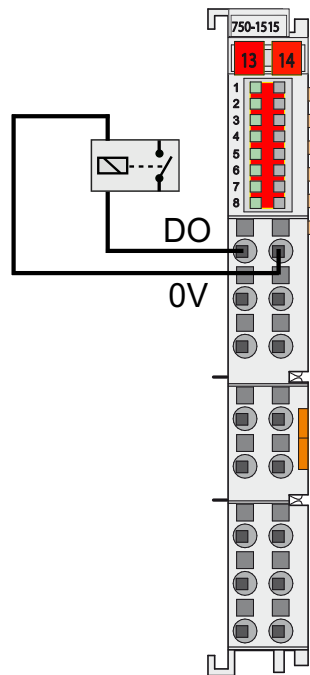


Active state of each input is **indicated** by green LED (on = logical one detected).

Complete specification of module is stated in particular datasheet:

[w750-1415](#)

**Digital outputs** Digital outputs module **750-1515** has 8 output channels (24 V DC, 0.5 A, short-circuit protected, 1 kHz). See scheme below for connection:

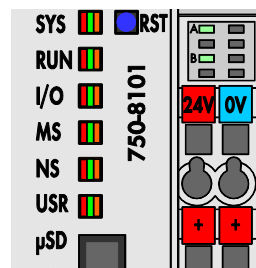


Switched status of each output is indicated by a green LED in the upper part of the module.

Complete specification of module is stated in particular datasheet:

[w750-1515](#)

#### LED indication



Red/ green/ orange LED (blink):

SYS – system status

RUN – runtime is running

I/O – bus status (not used)

MS – module status (not used)

NS – not used

USR – user programmable

green LED:

uSD – SD card status (blinks during writing on card)

A – state of supply voltage (still)

B – state of I/O modules supply voltage (still)

#### Switches

RST

RESET STOP RUN

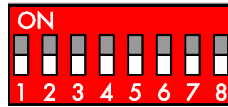


Reset button - unused

Switch in RUN position starts the runtime. Turning the switch in STOP position stops the runtime. In this position it is not possible to deploy and run solution.

Holding switch in the RESET position for 2-7 seconds causes warm restart. Holding RESET for longer than 7 seconds invokes cold restart.

**Address** By DIP switches the IP address can be set:  
0 – default address / SW address  
1...254 – fixed address (192.168.1.1...254)  
255 – DHCP



switches 1...8 have weight 1...128

## Others

### Internal K-bus addressing

For each module a position corresponding to the physical position in assembly is given to the module. E.g. first module after controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image *Dimensions and connection*).

You can find complete specification of each device at [www.wago.com](http://www.wago.com).

## Programing

The main programming tool is the Domat package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Domat IDE). The Domat package contains also LCD menu editor as well as web editor (Domat HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

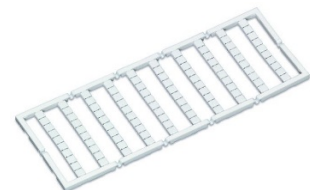
**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT104/200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

## Accessories

### Mini-WSB marking card (247-513)

- snap-on type
- horizontal markings of each module



**Safety note**

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Cyber security note**

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

01/2020 – First datasheet version.

12/2021 – Module datasheets links update, stylistic adjustments.

02/2022 – Logo change, stylistic modifications, added information about limiting the number of connected clients.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

05/2022 – Memory size update.

08/2022 – Stylistic modifications (list of modules, order number).

04/2023 – SD card slot function specified.

08/2023 – Change of names from Merbon to Domat.

order number

## **w751-9301      DDC controller**



### **Summary**

DDC (Direct digital control) controller w751-9301 is free programmable process station with Cortex A7, 650 MHz processor and Linux OS. It contains two Ethernet ports, 4× AI, 8× DI, 2× AO, 4× DO and RS485 interface. Controller is suitable for control of larger installations (approximately 400 to 500 physical data points).

### **Application**

- Free programmable control unit for HVAC systems and other applications with web access
- Data acquisition, processing, and presentation systems with advanced networking features
- Protocol converters with web data presentation (must be programmed by user)

### **Function**

The controller hosts an embedded Linux operating system which boots up the Domat runtime with the application. The board contains real time clock with battery backup, flash memory containing OS, runtime, application, and other data (time programs, setpoints etc.), and a watchdog. It is also possible to use NVRAM to backup parameters in case of unexpected system shutdown.

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

For communication with other devices, IMIOs contain 2× Ethernet ports. I/Os integrated on the board are 2× AI (temperature), 2× AI (voltage), 2× AO, 8× DI and 4× DO and RS485 interface.

Controller has sufficient computing power to control larger installation with external I/O modules and communication channels (for example Modbus TCP server, SSCP client, ...).

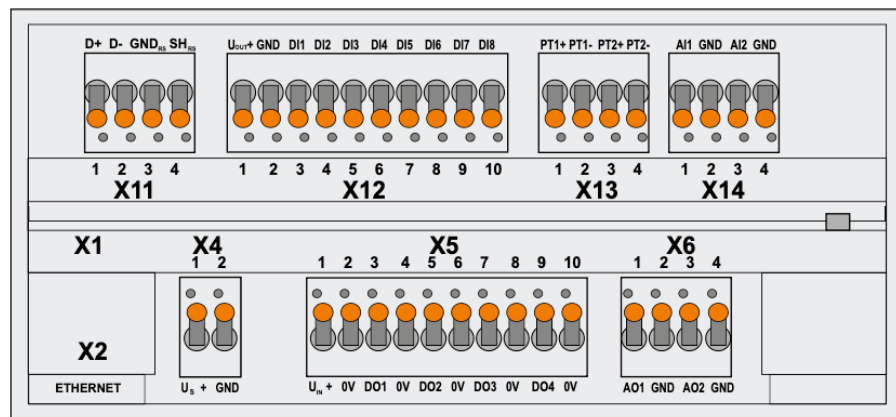
The process station contains a web server for remote connection and user intervention. The web pages are created in Domat IDE which is also used for uploading the exported web definition to the process station. From the security point of view, the website is not recommended for use in the public network, it is intended for operation in a local network., Therefore it is necessary to integrate the configured router or other element that ensures network security during the design of the network topology.

Module is 108 mm wide and mounts on a standard DIN rail.

## Technical data

|                        |                                                                                                               |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Power                  | 24 V DC (-15...+20 %), 4.6 W, push-in cage clamps                                                             |
| Operating temperature  | -25...60 °C                                                                                                   |
| Admissible humidity    | 5...95 %                                                                                                      |
| <b>PLC:</b>            |                                                                                                               |
| CPU                    | Cortex A7, 650 MHz                                                                                            |
| Memory                 | 512 MB RAM, 4096 MB FLASH, 128 kB NVRAM                                                                       |
| Memory card            | unsupported, not intended to be used by user                                                                  |
| Addressing             | SW                                                                                                            |
| <b>Communication:</b>  |                                                                                                               |
| Ethernet               | 2 × Ethernet 10/100, RJ45                                                                                     |
| Serial port            | RS485                                                                                                         |
| Programming enviroment | Domat IDE (ST, FBD)                                                                                           |
| Terminals              | cage clamps - wire 0.2...1.5 mm <sup>2</sup>                                                                  |
| Analogue inputs        | 2 × Pt 1000, (Ni1000, 440...4400 Ω), 16 bit, -60...350 °C<br>2 × 0...10 V DC, 16 bit                          |
| Analogue outputs       | 2 × 0...10 /±10 V DC, 12 bit                                                                                  |
| Digital inputs         | 8 × 24V DC – need to connect DC voltage, e.g. Uout+                                                           |
| Input voltage „log. 0“ | max. 5 V DC, 2.8 mA                                                                                           |
| Input voltage „log. 1“ | 11...30 V DC, 2.8 mA                                                                                          |
| Digital outputs        | 4 × NO, max. 0.5A, 24 V DC, max. 1 kHz                                                                        |
| Dimensions             | 55 (h) × 108 (w) × 90 (h) mm                                                                                  |
| Protection degree      | IP20                                                                                                          |
| Material               | polycarbonate, polyamide                                                                                      |
| Standards conformity   | electromagnetic compatibility (EMC)EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

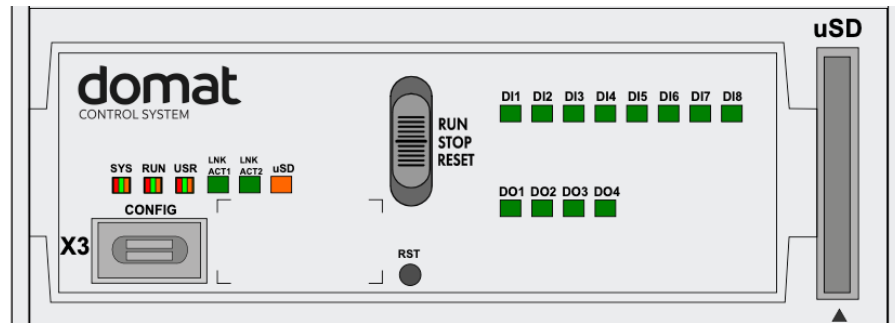
## Terminals



### Terminals and connectors

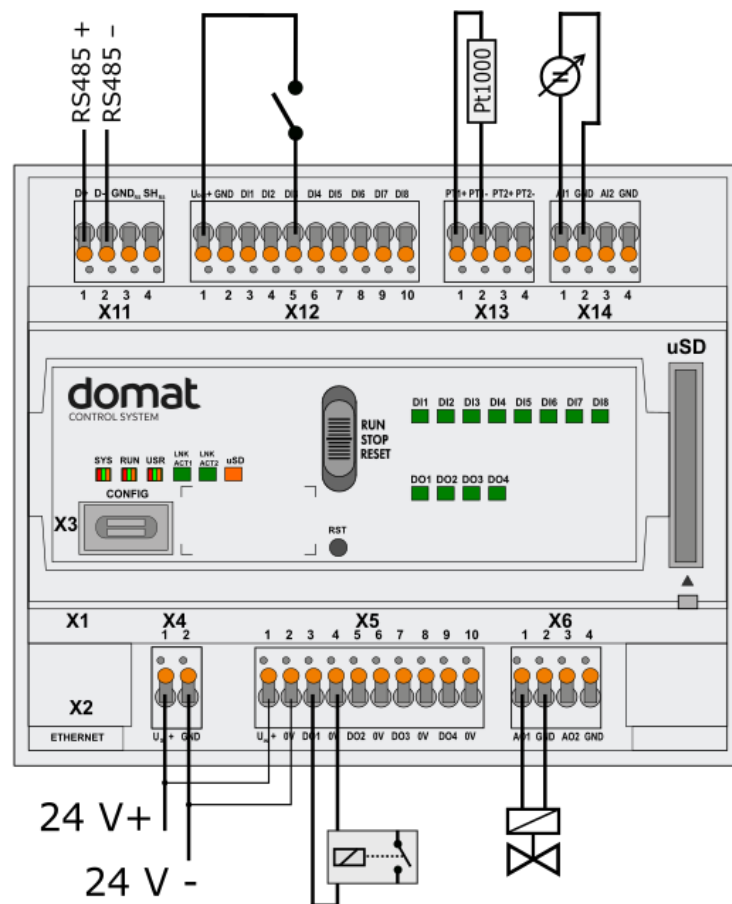
|                            |                                                                                                                               |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| <b>US+ (X4)</b>            | power                                                                                                                         |
| <b>GND</b>                 | ground                                                                                                                        |
| <b>DO1...DO4 (X5)</b>      | relay output 1...4, normally open against 0V<br>(for proper function connect $U_{S+}$ with $U_{IN+}$ , and GND with 0V)       |
| <b>0V</b>                  | relay output 0V, ground                                                                                                       |
| <b>DI1...DI8 (X12)</b>     | digital inputs 1...8                                                                                                          |
| <b>Uout+</b>               | 24 V DC for DI                                                                                                                |
| <b>GND</b>                 | common wire for digital inputs                                                                                                |
| <b>PT1+, PT1- (X13)</b>    | analogue input 1 for temp. sensor                                                                                             |
| <b>PT2+, PT2- (X13)</b>    | analogue input 2 for temp. sensor                                                                                             |
| <b>AI1, AI2 (X14)</b>      | analogue input (voltage)                                                                                                      |
| <b>GND</b>                 | <b>analogue input ground</b> (common)<br>Notice:<br>GND is common for analogue inputs, analogue outputs and supply voltage.   |
| <b>AO1, AO2 (X6)</b>       | analogue outputs 1 and 2                                                                                                      |
| <b>GND</b>                 | <b>analogue outputs ground</b> (common)<br>Notice:<br>GND is common for analogue inputs, analogue outputs and supply voltage. |
| <b>RS485 (X11)</b>         | serial line RS485, terminals D+, D-<br>GND – ground, SH – shielding                                                           |
| <b>Eth0, Eth1 (X1, X2)</b> | network interface                                                                                                             |

## LED indication

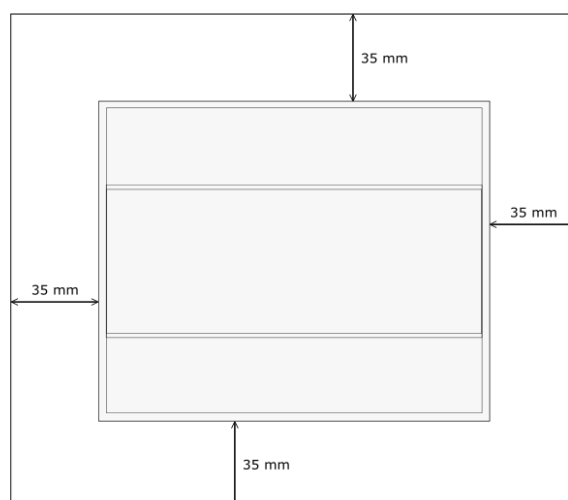


|                  |                                      |
|------------------|--------------------------------------|
| <b>SYS</b>       | System status (red, green, off)      |
| <b>RUN</b>       | PLC program status (red, green, off) |
| <b>USR</b>       | unused                               |
| <b>LNK ACT1</b>  | Eth connection status (green, off)   |
| <b>LNK ACT2</b>  | Eth connection status (green, off)   |
| <b>uSD</b>       | unused                               |
| <b>USB C</b>     | unused                               |
| <b>DI1...DI8</b> | input ON (green), input OFF (off)    |
| <b>DO1...DO4</b> | output ON (green), output OFF (off)  |

## Connection

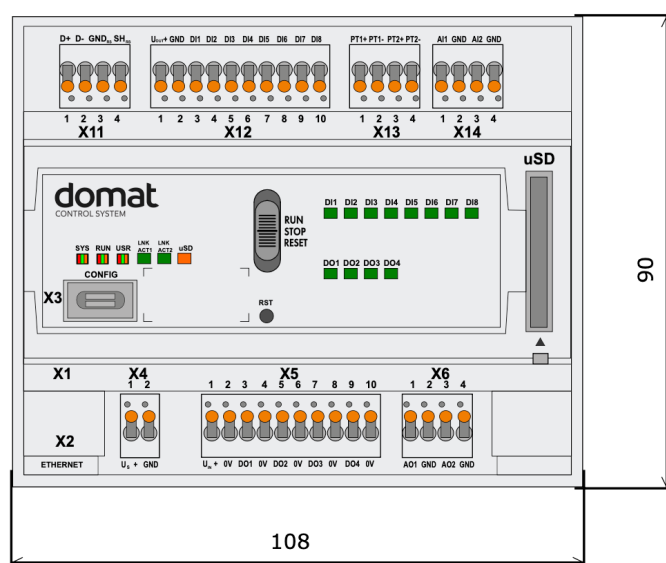


During the installation, ensure sufficient distance of controller from other components:



For nestandard installation max. ambient temperature is 50 °C.

## Dimensions



Dimensions are in *mm*.

## Programming

### Domat IDE

Programming tool Domat IDE contains I/O editor, graphical editor of the function plan (FBD), structure text editor, web page editor and LCD menu editor (HMI) for PLC and compiler.

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). In addition to function blocks, the application program can also be compiled from structured text, or a combination of both languages can be used.

The minimum guaranteed number of records for history on the PLC is 79 000, but the actual number of stored samples may be larger depending on the data types that are stored in the history.

**Communication** Default network settings are:

IP address: 192.168.1.10  
subnet mask: 255.255.255.0  
default gateway: 192.168.1.1

SSCP user: admin

Password: rw

Notice: Do not forget to record the new network settings after change!

The controllers can share variables over the Ethernet network (outside temperature, heat demands etc.) together with other PLC platforms.

The runtime provides drivers for communication with I/O modules and other subsystems which communicates e.g. through Modbus TCP/RTU (server/client), M-Bus, IEC62056-21, SSCP, SoftPLC link and BACnet IP server/client (see PICS). The complete list of drivers can be found in the Channel configuration dialogue in the most recent Domat release. Please check the required protocol features and functions with the list of implemented features in the Domat IDE help. It is also possible to program own communication drivers using the I/O library functions in structure text language.

**Number of communication channels** (on the serial lines and Ethernet) to I/O modules and subsystems is not directly restricted. It depends on available RAM PLC memory.

**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

**Number of connections from Modbus TCP clients on Modbus TCP server is max. 5.**

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

Other clients channels (web etc.) are not directly restricted.

**WEEE notice** Should device contain any non-rechargeable battery, please return it to the manufacturer or dispose of it in compliance with local regulations, after the device is not operable.

**Safety note**

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Cyber security note**

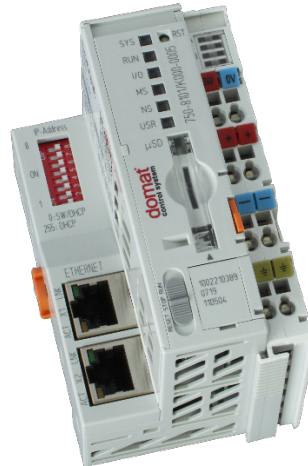
The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

10/2023 – First datasheet version.

04/2024 – Information about INIT switch removed.

order number

**w750-8101****DDC controller****Summary**

DDC (Direct digital control) controller w750-8101 is a freely programmable PLC with Domat RT. It provides two ethernet ports. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O module within the 750/753 series.

**Application**

- Free programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

**Function**

The w750-8101 has a twin-port Ethernet interface and thanks to its integrated switch it is able to connect more PLCs in a line topology.

The PLC shall be completed by I/O module cards, which are supplied separately. Recommended datapoint load is about 300 I/Os per PLC. The I/O modules communicate with the main unit over an internal bus, K-bus.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Domat IDE
- Direct connection of I/O modules
- 2x Ethernet (configurable)
- Operating system Linux
- Maintenance free

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of

connections the PLC has to handle.

The process station contains a web server for remote connection and user intervention. The web pages are created in Domat HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Domat IDE.

State of inputs and outputs of each module, status of system, runtime and power supply is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

Controller is made from processor module [PFC100 \(750-8101\)](#).

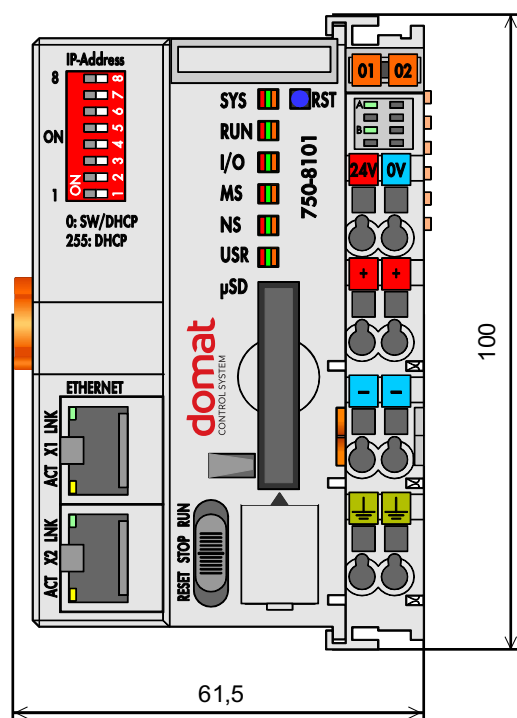
See *domat – Technical application notes* for connection examples.

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## Technical data

|                          |                                                                                                                |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (–25...+30 %), 1.8 W, cage clamp type terminals                                                        |
| Operating temperature    | 0 ÷ 55 °C                                                                                                      |
| Max. admissible humidity | 95 %                                                                                                           |
| <b>PLC:</b>              |                                                                                                                |
| CPU                      | Cortex A8, 600 MHz                                                                                             |
| Memory                   | 256 MB RAM, 64 kB NVRAM                                                                                        |
| Memory card              | unsupported, not intended to be used by user                                                                   |
| Addressing               | SW or by DIP switches                                                                                          |
| <b>Communication:</b>    |                                                                                                                |
| Ethernet                 | 2× Ethernet 10/100, RJ45                                                                                       |
|                          | 2× signalling LEDs (Link, Data) in the Ethernet connector                                                      |
| Programming enviroment   | Domat IDE ver. 2:4:0:x or later (ST, FBD)                                                                      |
| Terminals                | cage clamp terminals - wire 0.08...2.5 mm <sup>2</sup>                                                         |
| Dimensions               | 71.9 (h) × 61.5 (w) × 100 (d) mm                                                                               |
| Weight                   | approx. 380 g                                                                                                  |
| Protection degree        | IP20                                                                                                           |
| Material                 | polycarbonate, polyamide 6.6                                                                                   |
| Standards conformity     | electromagnetic compatibility (EMC) EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

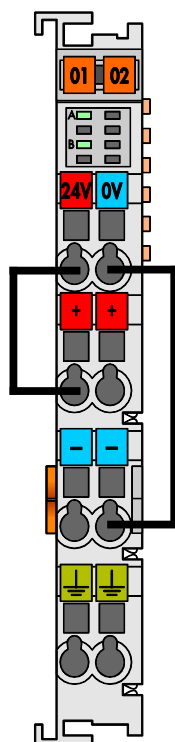
## Dimensions and connection



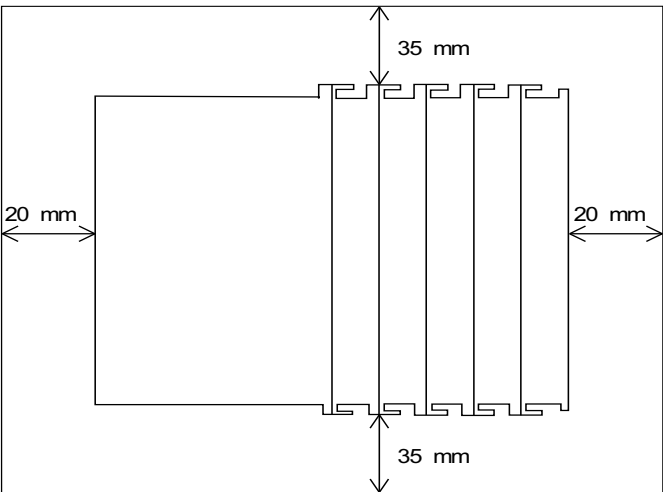
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

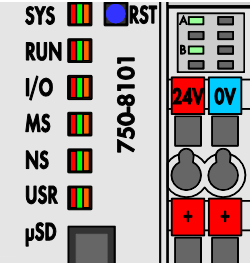
To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image below).



During the installation, ensure sufficient distance of controller assembly from the surrounding components:



LED indication



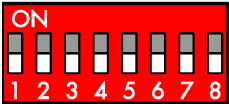
Red/ green/ orange LED (blink):  
SYS – system status  
RUN – runtime is running  
I/O – bus status (not used)  
MS – module status (not used)  
NS – not used  
USR – user programmable  
green LED:  
uSD – SD card status (blinks during writing on card)  
A – state of supply voltage (still)  
B – state of I/O modules supply voltage (still)

Switches



Address

Reset button - unused  
Switch in RUN position starts the runtime. Turning the switch in STOP position stops the runtime. In this position it is not possible to deploy and run solution.  
Holding switch in the RESET position for 2-7 seconds causes warm restart. Holding RESET for longer than 7 seconds invokes cold restart.  
By DIP switches the IP address can be set:  
0 – default address / SW address  
1...254 – fixed address (192.168.1.1...254)  
255 – DHCP



switches 1...8 have weight 1...128

Others

Internal K-bus addressing

For each module a position corresponding to the physical position in assembly is given to the module. The first module next to the controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

**Programming** The main programming tool is the Domat package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Domat IDE). The Domat package also contains LCD menu editor as well as web editor (Domat HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

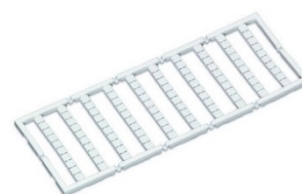
In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT104/200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

**Accessories** **Mini-WSB marking card (247-513)**

- snap-on type
- horizontal markings of each module



**Safety note** The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

**Cyber security note**

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

01/2020 – First datasheet version.

02/2022 – Wattage added, stylistic adjustments, change of logo.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

05/2022 – Memory size update.

08/2022 – Stylistic modifications.

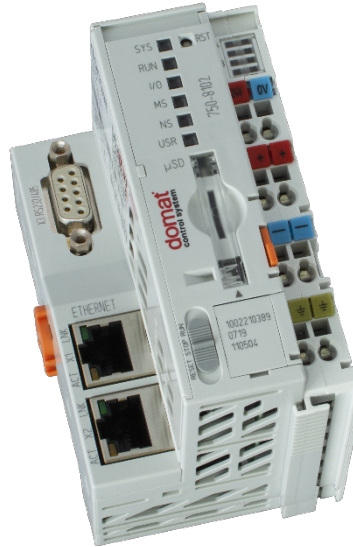
04/2023 – SD card slot function specified.

08/2023 – Change of names from Merbon to Domat

order number

**w750-8102**

**DDC controller**



#### Summary

DDC (Direct digital control) controller w750-8102 is a freely programmable PLC with Domat RT. It provides two ethernet ports. Besides network and fieldbus interfaces, the controller supports all analog, digital and special I/O module within the 750/753 series.

#### Application

- Free programmable control units for HVAC systems and other applications with web access.
- Data acquisition, processing, and presentation systems with advanced networking features.
- Protocol converters with web data presentation (must be programmed by user).

#### Function

The w750-8102 has a twin-port Ethernet interface and thanks to its integrated switch it is able to connect more PLCs in a line topology.

The PLC shall be completed by I/O module cards, which are supplied separately. Recommended datapoint load is about 300 I/Os per PLC. The I/O modules communicate with the main unit over an internal bus, K-bus.

Typical use of the PLC is in building control systems, industry and energy management systems.

- Programmable via Domat IDE
- Direct connection of I/O modules
- 2× Ethernet (configurable)
- 1× RS-232
- Operating system Linux
- Maintenance free

The application is created and uploaded in the Domat IDE development environment. The maximum application program size depends on number of

physical and software data points, amount of function blocks which require more memory (e.g. time schedulers), degree of code optimisation, and number of connections the PLC has to handle.

The process station contains a web server for remote connection and user intervention. The web pages are created in Domat HMI editor, which is included in the package of development programs. The exported web definition is uploaded to the process station through Domat IDE.

State of inputs and outputs of each module, status of system, runtime and power supply is indicated by LEDs.

Controller is to be mounted on standard DIN rail.

Controller w750-8102 is made from processor module [PFC100 \(750-8102\)](#).

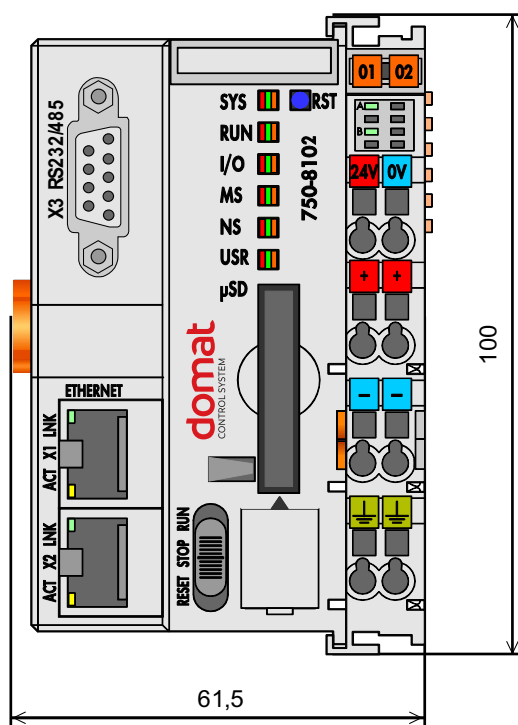
See *domat – Technical application notes* for connection examples.

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## Technical data

|                          |                                                                                                                |
|--------------------------|----------------------------------------------------------------------------------------------------------------|
| Power                    | 24 V DC (–25...+30 %), 1.8 W, cage clamp type terminals                                                        |
| Operating temperature    | 0...55 °C                                                                                                      |
| Max. admissible humidity | 95 %                                                                                                           |
| <b>PLC:</b>              |                                                                                                                |
| CPU                      | Cortex A8, 600 MHz                                                                                             |
| Memory                   | 256 MB RAM, 64 kB NVRAM                                                                                        |
| Memory card              | unsupported, not intended to be used by user                                                                   |
| Addressing               | SW                                                                                                             |
| <b>Communication:</b>    |                                                                                                                |
| Ethernet                 | 2 × Ethernet 10/100, RJ45<br>2 × signalling LEDs (Link, Data) in the Ethernet connector                        |
| RS-232                   | 1 × RS-232                                                                                                     |
| Programming enviroment   | Domat IDE ver. 2:4:0:x or later (ST, FBD)                                                                      |
| Terminals                | cage clamp terminals - wire 0.08...2.5 mm <sup>2</sup>                                                         |
| Dimensions               | 71.9 (h) × 61.5 (w) × 100 (d) mm                                                                               |
| Weight                   | approx. 380 g                                                                                                  |
| Protection degree        | IP20                                                                                                           |
| Material                 | polycarbonate, polyamide 6.6                                                                                   |
| Standards conformity     | electromagnetic compatibility (EMC) EN 61000-6-2, 61000-6-3<br>environmental testing EN 60068-2-42, 60068-2-43 |

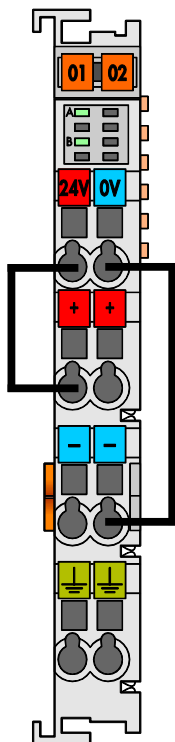
## Dimensions and connection



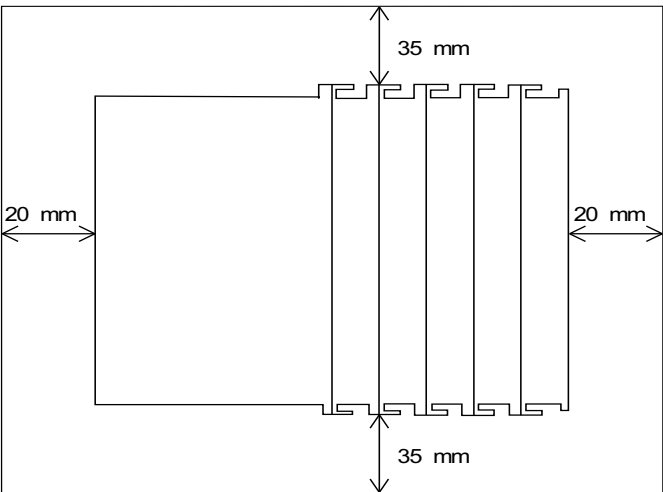
Dimensions are in *mm*.

For proper function of the controller assembly a **terminating module** 750-600 must be snapped at the end of assembly. All modules must be aligned.

To ensure power supply for the connected I/O modules, it is required to connect the **24V** and **+**, **0V** and **-** terminals on the power module (see image below).



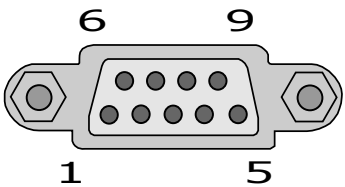
During the installation, ensure sufficient distance of controller assembly from the surrounding components:



**Serial port**

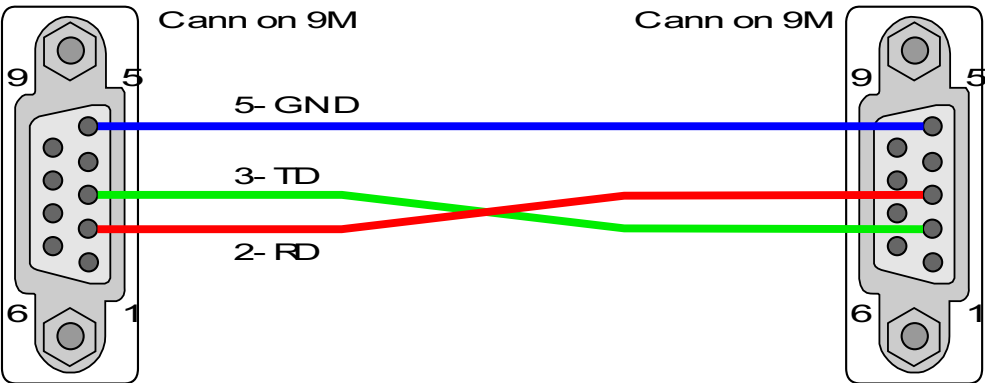
W750-8102 controller has serial interface with Cannon 9F connector, which can be used as RS-232 or as RS-485.

Voltage levels for RS-232 and RS-485 are different!  
Ensure correct setting and connection.

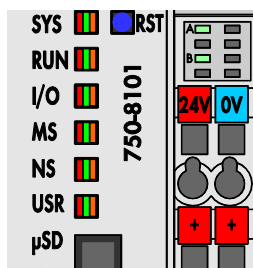


| Pin       | RS-232    |                 | RS-485     |                         |
|-----------|-----------|-----------------|------------|-------------------------|
| 1         | NC        | Not assigned    | NC         | Not assigned            |
| 2         | RxD (out) | Receive data    | NC         | Not assigned            |
| 3         | TxD (in)  | Transmit data   | A (Tx/Rx+) | Transmit/receive data + |
| 4         | NC        | Not assigned    | NC         | Not assigned            |
| 5         | FB_GND    | Ground          | FB_GND     | Ground                  |
| 6         | NC        | Not assigned    | FB_5V      | Power supply            |
| 7         | RTS (in)  | Request to send | NC         | Not assigned            |
| 8         | CTS (out) | Clear to send   | B (Tx/Rx-) | Transmit/receive data - |
| 9         | NC        | Not assigned    | NC         | Not assigned            |
| Enclosure | Shield    | Shielding       | Shield     | Shielding               |

For connection of GSM modem to build-in RS232 port the null-modem M-M cable (2-3, 3-2, 5-5) should be used.



## LED indication



Red/ green/ orange LED (blink):

SYS – system status

RUN – runtime is running

I/O – bus status (not used)

MS – module status (not used)

NS – not used

USR – user programmable

green LED:

uSD – SD card status (blinks during writing on card)

A – state of supply voltage (still)

B – state of I/O modules supply voltage (still)

## Switches

RST

RESET STOP RUN



Address

Reset button - unused

Switch in RUN position starts the runtime. Turning the switch in STOP position stops the runtime. In this position it is not possible to deploy and run solution.

Holding switch in the RESET position for 2-7 seconds causes warm restart. Holding RESET for longer than 7 seconds invokes cold restart.

By SW

## Others

**Internal K-bus addressing**

For each module a position corresponding to the physical position in assembly is given to the module. The first module next to the controller gets adress 1, etc.

Slot for SD card is for production purposes only, not intended to be used by user.

## Programming

The main programming tool is the Domat package which contains I/O editor, graphical editor of the function plan (FBD), structure text editor and compiler (Domat IDE). The Domat package contains also LCD menu editor as well as web editor (Domat HMI).

The application program consists of function blocks which are stored in libraries. Those contain analogue and digital functions, mathematical blocks including goniometric functions, time schedulers, alarm blocks, and HVAC specific blocks (heat recovery, dewpoint calculation, enthalpy, pump switch etc.). The program can be set up also as structure text (ST) or with combination of both types of programming languages.

In case of implementation of your own ST driver, there is limitation of max. 10 clients connected simultaneously.

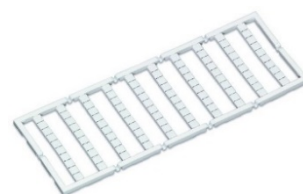
**Number of connections from SSCP clients is max. 20.** This includes connections from Domat IDE, Domat SCADA, HT104/200, mobile application Domat Visual, connection from other PLCs over SSCP etc.

Uploading a project from the Domat IDE reserves two SSCP TCP connections.

## Accessories

**Mini-WSB marking card (247-513)**

- snap-on type
- horizontal markings of each module



## Fieldbus connector PROFIBUS (750-960)



### **Safety note**

The device is designed for monitoring and control of heating, ventilation, and air conditioning systems. It must not be used for protection of persons against health risks or death, as a safety element, or in applications where its failure could lead to physical or property damage or environmental damage. All risks related to device operation must be considered together with design, installation, and operation of the entire control system which the device is part of.

### **Cyber security note**

The product may influence the information and cyber security (ICS) of the control system. It is supplied in default settings. Implementation and continuous compliance with the ICS rules (e.g. creating and upload of certificates and keys, their updates and management, protection against misuse, etc.) are fully the responsibility of the control system operator. The manufacturer is not responsible for damages which originated or may originate due of wrong or insufficient implementation of ICS rules when using the device. In case of questions, please contact Domat Control System technical support.

**Changes in  
versions**

01/2020 – First datasheet version.

02/2022 – Wattage and GSM modem connection to RS232 info added, change of logo.

03/2022 – Modified number of simultaneously connected clients using the SSCP protocol.

05/2022 – Memory size update.

08/2022 – Stylistic modifications.

04/2023 – SD card slot function specified.

08/2023 – Change of names from Merbon to Domat