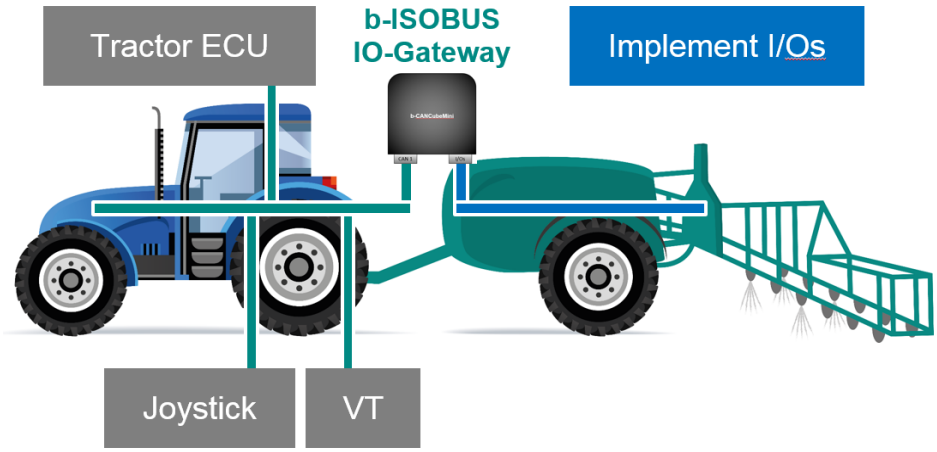
b-ISOBUS IO Gateway

Manual

Version V01.03



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1 General Information

1.1 Important Notice

Before using these components, please read carefully through these instructions. The legislator orders to give you some important notes for your safety and the avoidance of damages to the device and other equipment.

- The connection to the power supply must match in polarity. If not the use can lead to destruction
- The correct supply voltage must be used U=+ 8...32 V DC
- The components must be used within the defined valid limits of a secured small voltage supply (SELV-Standard EN60950). This restriction must be applied to all connections to the product.
- The use of a supply voltage outside the defined range can lead to damage or even the destruction of EngineMonitorPlus.
- Don’t connect the device directly to the line voltage 220 V (AC)
- Avoid mechanical bracing when mounting the device.
- The device has passed a detailed test procedure. Consequently, the device has left our company in perfect condition. Please check the device for damage caused by careless transport or storage before taking the device into operation. If the device arrived in damaged condition, putting the damaged device into operation is absolutely forbidden.
- The device must not be used in case of defective safety equipment, incorrectly assembled or malfunctioned safety and protection preparations.
- Please check if the device is suitable for your application before putting it into operation. Especially, pay attention to the allowable ambient and operation conditions and the allowable limiting values on the data sheet.
- Removing the type label (serial number), self-done repairing or modifications to the device are forbidden.
- First read carefully the user manual, containing notes and warning information to care about, before using the device the first time, to guarantee secure operation.
- All data at nominal input and 25° C ambient temperature, if not marked otherwise.
- Strain with extreme values for a longer period may affect the reliability. Even using the device in the allowed operation condition ranges the life time of the device can be shortened by using it permanently near the limits.
- Tolerance of extreme values is liable to common fluctuations.
- Technical modifications without notice reserved.

If something is not clearly described or if some information is missing, please contact b-plus. The responsible employees will support you.

1.2 Warranty

The herein described product as well as this user manual was originated in high quality development and production process that was performed by b-plus GmbH with the best of their knowledge. Nevertheless unknown errors (hardware, software, documentation) are still possible, like in other products. b-plus GmbH doesn't take over any liability for such errors and corresponding material damages (e.g. to devices, machines and plants), immaterial damage (e.g. production loss, data loss) as well as injuries to persons. In case of modifications of the product by the customer (e.g. shedding the hardware or a soldering process) b-plus GmbH refuses any liability. Place of jurisdiction for legal

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action is 94469 Deggendorf (Germany). b-plus GmbH reserves the right to modify technical data and the function of the unit as well as the user manual without former notification. The customer has to check the proper function of the product immediately after delivery. Any complaints are to be forwarded to b-plus GmbH in a written form or via fax with a detailed description of the deficiency. The product will receive a corresponding repair number and can only be sent back highlighting this number.

1.3 Copyright Notice

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1.4 Technical Support

Technicians and engineers from b-plus GmbH and/or its subsidiaries are available for technical support. We are committed to making our product easy to use and will help you use our products in your systems. Please consult our web site at http://www.b-plus.com for the latest product documentation, utilities drivers and support contacts.

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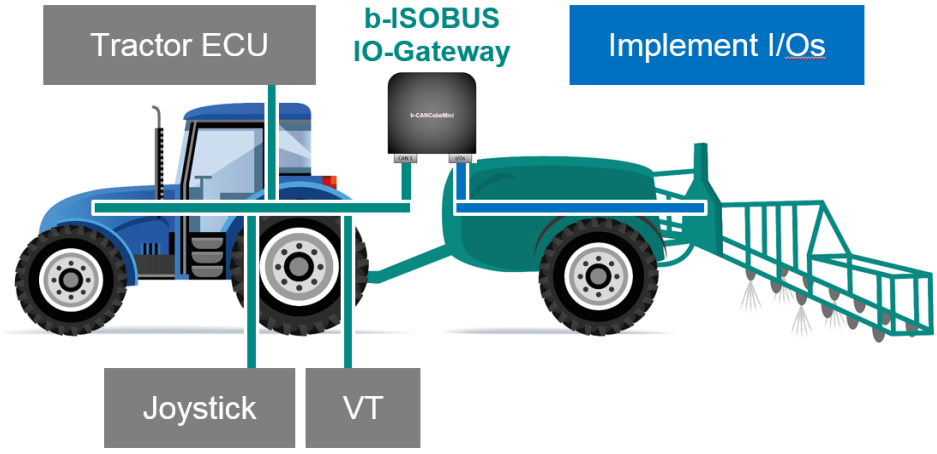
2 Introduction

The b-ISOBUS IO Gateway provides a simple way to get your agricultural implement into the ISOBUS world.

It provides the functionality of 5 configurable inputs and 6 configurable outputs to any ISO-VT. For this purpose, the gateway provides the entire Virtual Terminal client functionality as well as the AUX-N functionality.
The gateway solution is built up of the AEF certified b-CANCubeMini controller and the ISO 11783-compliant b-ISOBUS stack.
All inputs and outputs are configurable in the application interface on the VT. Each input can be configured as voltage measurement 0-10V / 0-32V, frequency measurement, current measurement 0-20mA or digital high / low switching.
Each output supports PWM, PWM current controlled or digital high / low switching.

The b-ISOBUS IO Gateway is also available with optional Task Controller Client functionality.



5 Inputs

- Digital high/low switching
- Voltage 0...10V / 0..32V
- Current 0...20mA
- Frequency 0…30 kHz

6 Outputs

- Digital high/low switching
- PWM / PWM current-controlled

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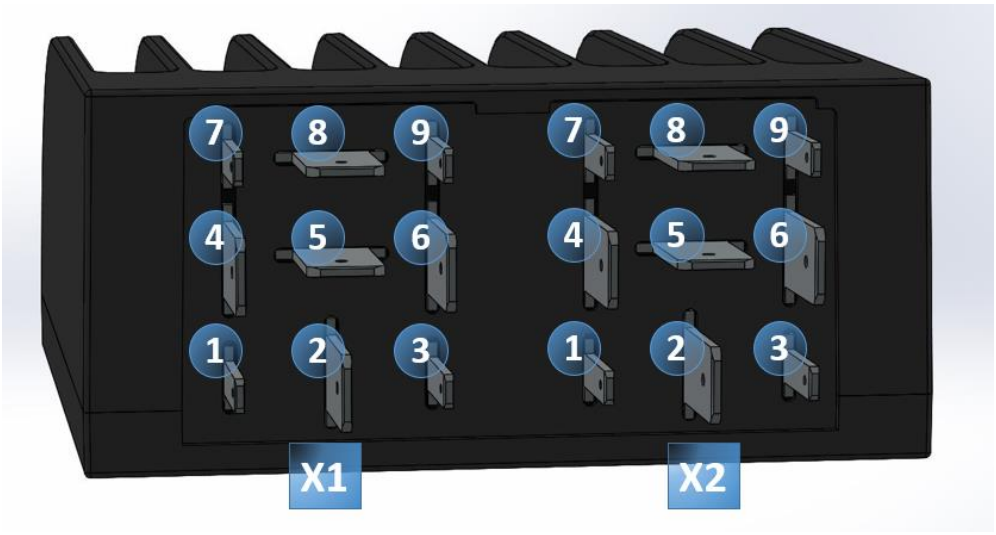
3 Hardware

3.1 Connection



X1		X2	
1	Input 3	1	CAN2-Low
2	Input 1	2	Ground
3	CAN1-Low (ISOBUS)	3	Output 3
4	Input 4	4	Output 6
5	Ground	5	Output 4
6	Supply V_{bb}	6	Output 2
7	Input 5	7	CAN2-High
8	Input 2	8	Output 5
9	CAN1-High (ISOBUS)	9	Output 1

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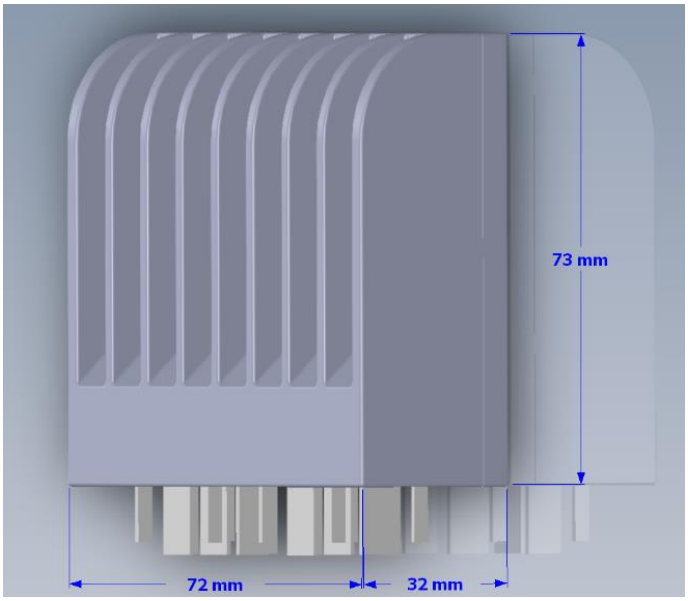
3.2 Hardware Specification



Operating temperature:	-40 ... 85 °C
Protection class:	IP54
Housing:	aluminum, black anodized

3.3 Mounting

Clamp for rail mount (35mm)

Twin automotive relay 2x 9-pole

Back side 2x M3 inner thread

order-no.

B20100-CCM-000-M130	B20100-CCM-000-M110
b-CANCubeMini-Railmountset	b-CANCubeMini-Relaismountset

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3.4 Qualification

- E-Mark (UN/ECE-R10)
- CE (Industry 61000-6-2, 61000-6-4)
- Construction machinery (EN13309:2010)
- Agricultural and forestry machinery (DIN EN ISO 14982:2009)
- USA FCC CLASS A
- Japan VCCI CLASS A
- Vibration (EN60068-2-6)
- Shock (EN60068-27)
- Dry Heat (EN60068-2-2)
- Cold (EN60068-2-1)
- Change of Temperature (EN60068-2-14)
- AEF ISOBUS Conformance Test Hardware

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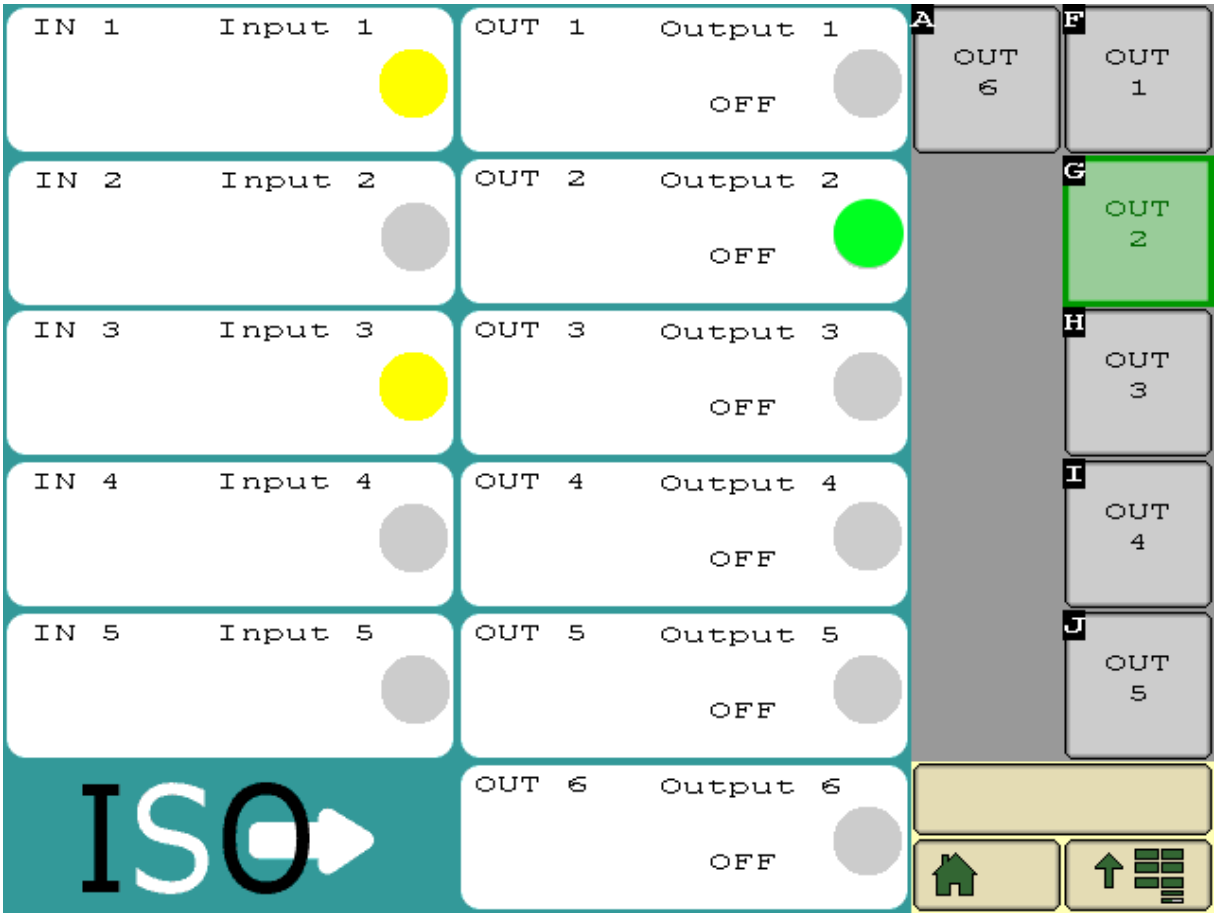
4 Application

The b-ISOBUS IO Gateway VT Client working set is represented by ISO .

The main data mask is shown up with a default configuration of the inputs and outputs.
This is an example on a John Deere GreenStar 3 VT:



All inputs are configured as “Digital Plus” with ON-colour is yellow and OFF-colour is grey.
The outputs are all used as “Digital Plus - Momentary” with ON-colour is green and OFF-colour is grey.

The appearance of the main page depends on the b-ISOBUS IO Gateway configuration.

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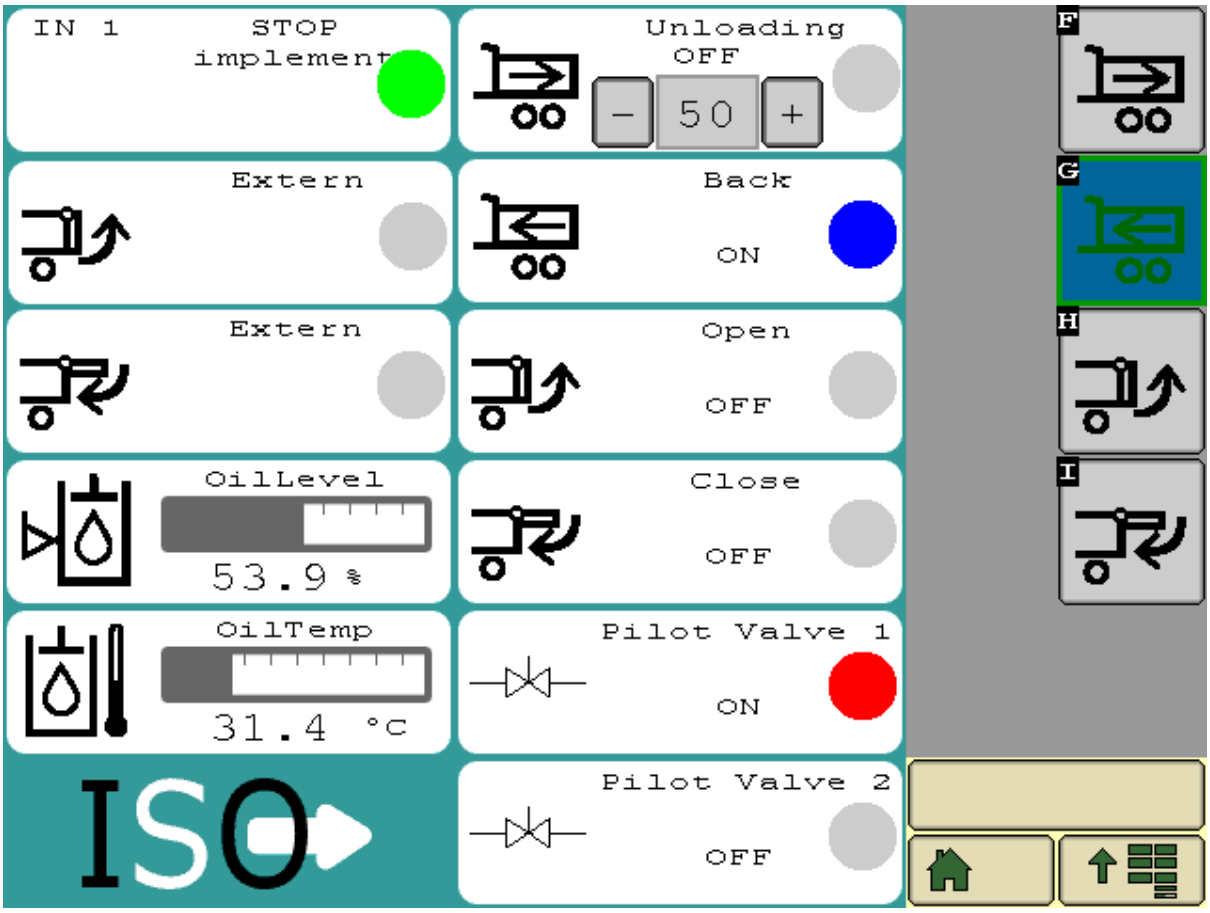
This is an example with a non-default configuration (on JD GS3 VT):



This example shows some different representations of input/output types together with several icons configured for each input or output. The softkeys for output 5 and output 6 have disappeared because of the configured function “pilot valve” for both outputs.

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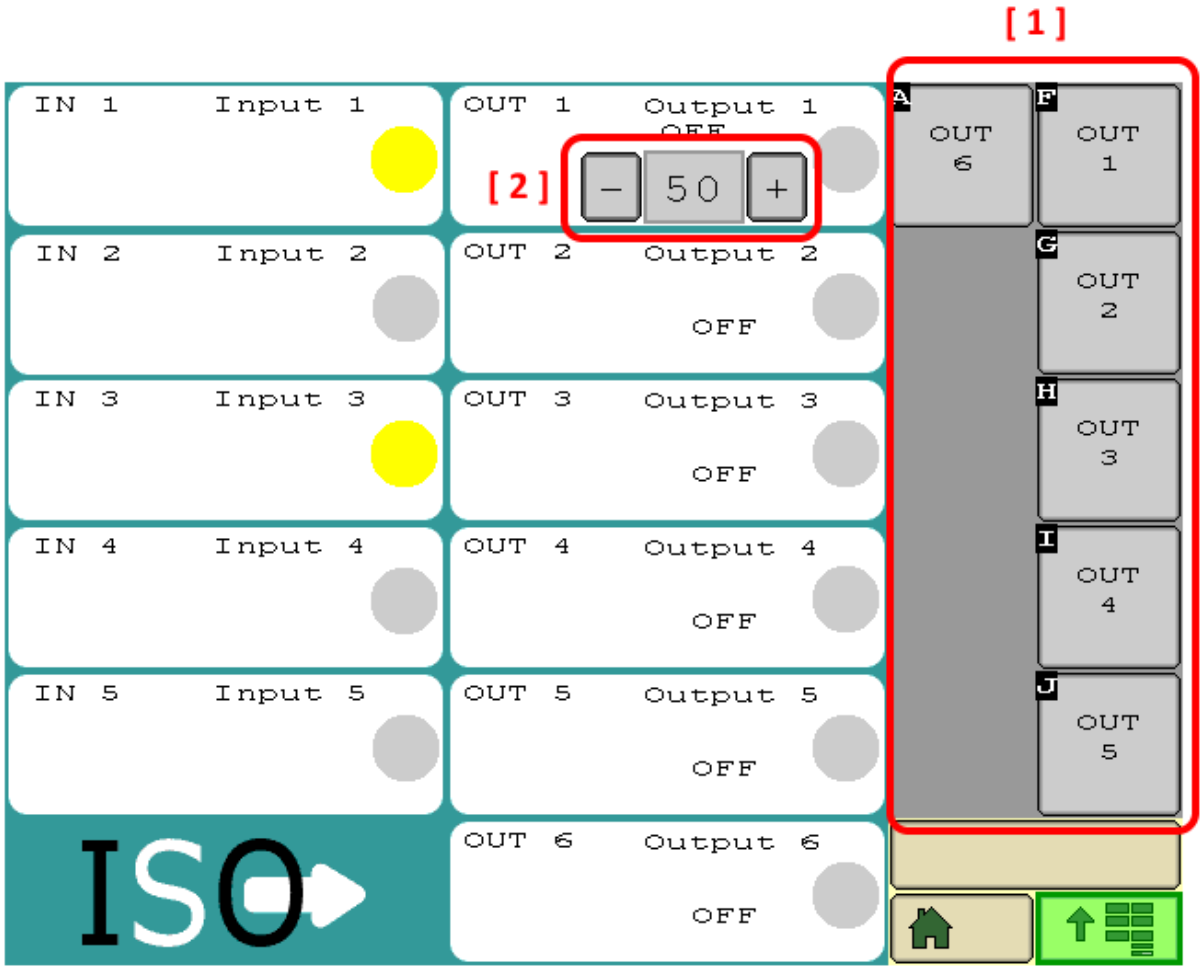
4.1 Operating the Outputs

4.1.1 Outputs via VT

All outputs can be operated on the main data mask of the VT client.

Each output always has a ON/OFF control. This can be done with the corresponding softkey of the output 1-6. **[1]** highlights the softkeys on a JD GreenStar 3 VT.

A digital output has only this ON/OFF control. An analog output (PWM or PWM-I [PWM current-controlled]) has an additional setpoint value, presented as 0 – 100%. This setpoint value can only be changed with the +/- buttons in the data mask, e.g. see **[2]**.



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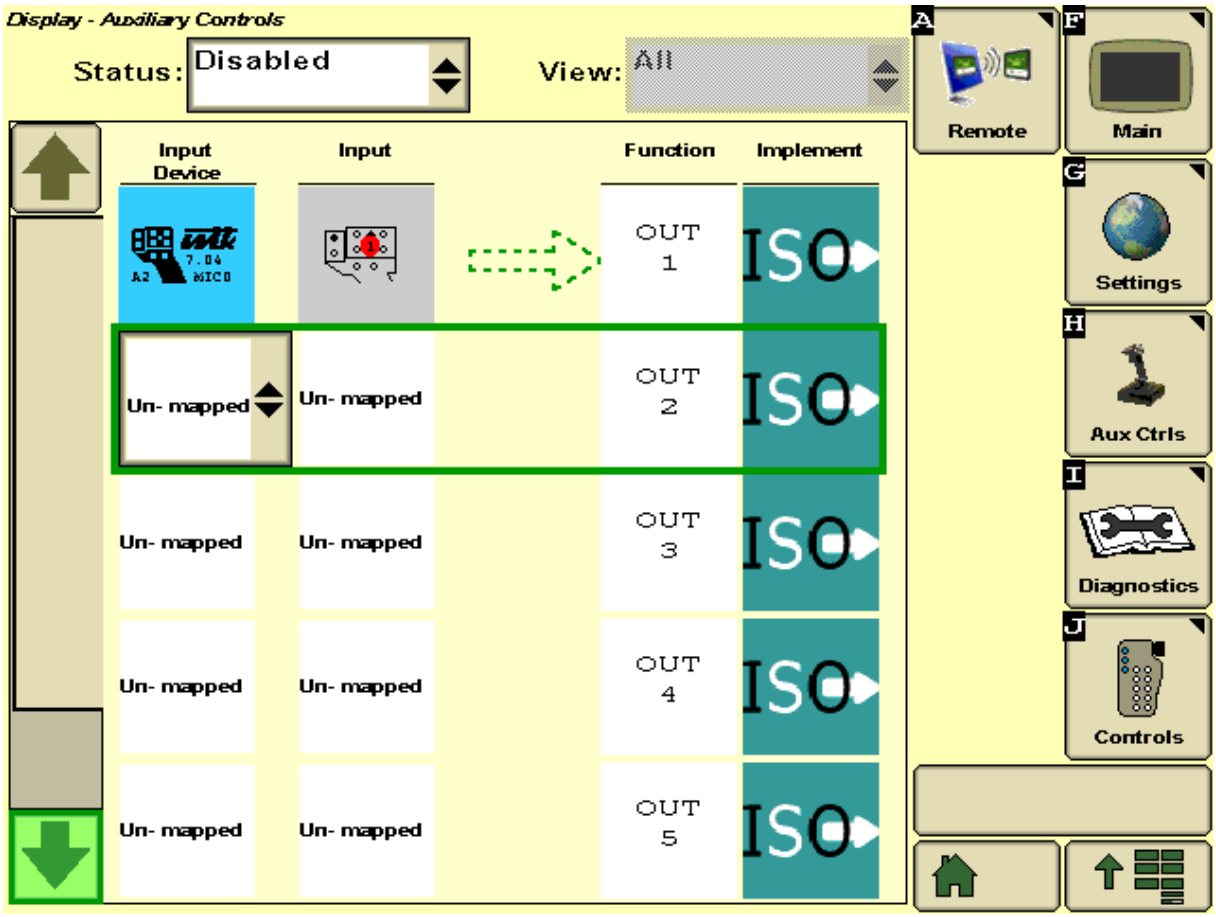
4.1.2 Outputs via Auxiliary Control Functions

The b-ISOBUS IO Gateway supports an Auxiliary Control type 2 function (AUX-N) for each output softkey. These AUX-N functions are configured as functions type = 2 = Boolean Non-Latching and they are displayed with the same text or icon as the corresponding softkey.

The user has the opportunity to use an auxiliary control input to operate the ON/OFF control of each output. The b-ISOBUS IO Gateway doesn't support AUX-N functions to control the analog setpoint values.

This is an example of the auxiliary control assignment on a JD GreenStar 2 VT:



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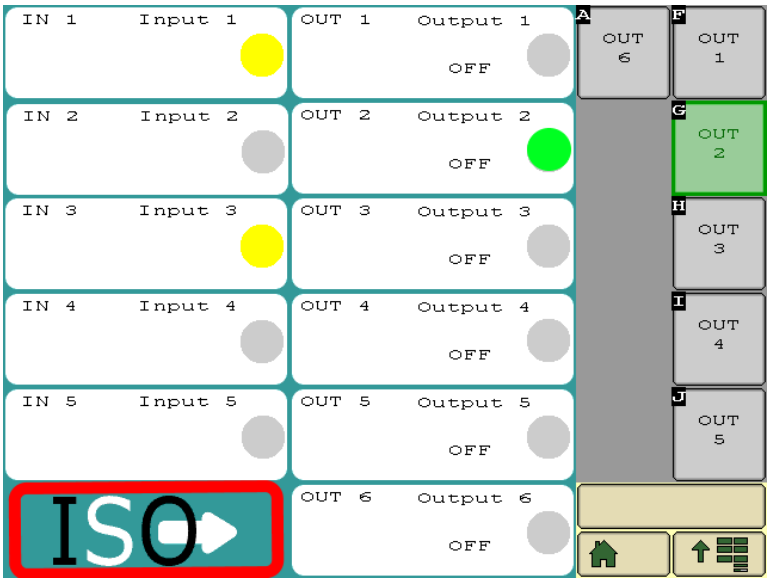
4.2 Settings and Configuration

The user can enter the settings and configuration menu by pressing the button in the main data mask.
The user will switch to the “Info” data mask.



4.2.1 Info Data Mask

The “Info” data mask presents version and manufacturer information. The user can also find some useful settings on the data mask and several softkeys to enter the other configuration mask. All of these further configuration options are protected by password.

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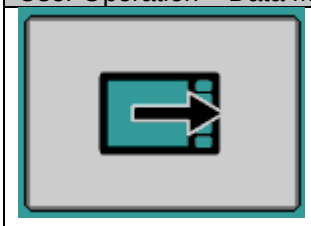
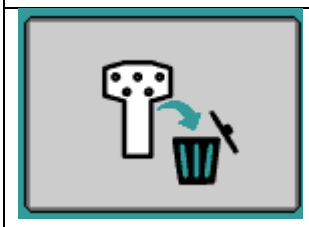
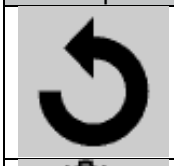
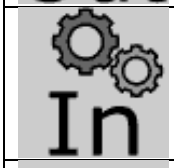
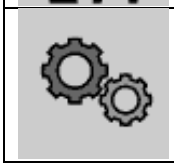
User Operation – Data Mask	
	Switch to next VT If there are more VTs available in the ISOBUS network the user can move the b-ISOBUS IO Gateway application to the next VT by pressing the button. (Next VT means the next available VT in the address claim name table.) The application will disconnect from the current connected VT, disappear for some seconds and connect to the other VT. The gateway remembers its last successful VT connection. After a restart the gateway waits for its preferred VT connection for 30 seconds. After this time, it will connect to the next available VT.
	Delete Aux-Assignment After the user has configured and activated an auxiliary assignment, this assignment is stored as preferred assignment in the gateway. With each restart this preferred assignment is communicated to the VT. The user only has to activate this assignment again. By pressing this button, the Auxiliary Control preferred assignment will be deleted.

User Operation – Softkeys	
	Go back to main data mask.
	Go forward to Output Configuration. If the menu isn't unlocked by password yet, the user has to enter this first.
	Go forward to Input Configuration. If the menu isn't unlocked by password yet, the user has to enter this first.
	Go forward to General Settings. If the menu isn't unlocked by password yet, the user has to enter this first.

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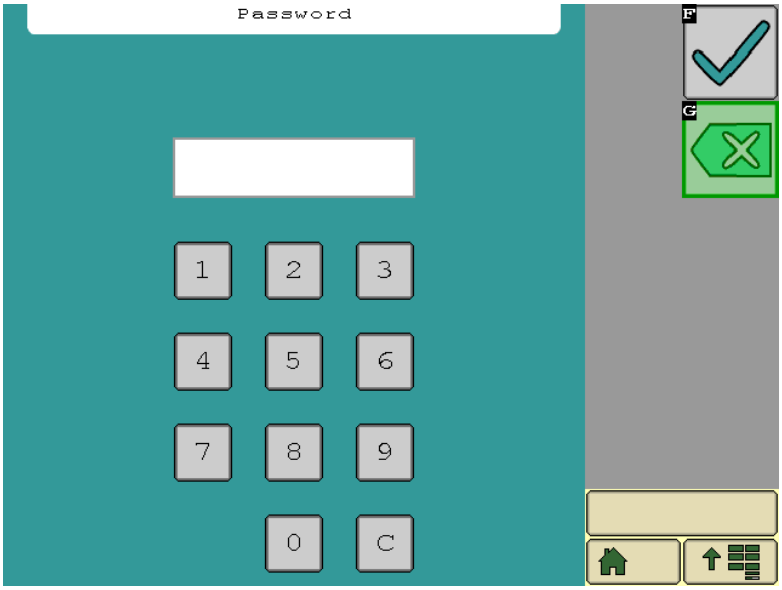
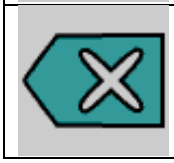
4.2.2 Password Data Mask

The password data mask will appear if the user wants to enter a protected configuration menu and the application is not unlocked yet.

The b-ISOBUS IO Gateway has only a non-changeable password.

Password: 1859



User Operation – Softkeys	
	Confirm the password.
	Cancel and go back.

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4.2.3 Output Configuration Data Mask

The user can configure each output on the Output Configuration data mask.

[1]	Switch the output shown on the configuration data mask.
[2]	Description text for this output. [max. 20 characters]
[3]	Configure an icon for this output. Please see Annex 1 for a list of available icon index numbers.
[4]	General Output configurations.
[5]	Combination options
[6]	PWM / PWM-I settings

User Operation – Softkeys	
	Save the changed configuration data and go back to info data mask.

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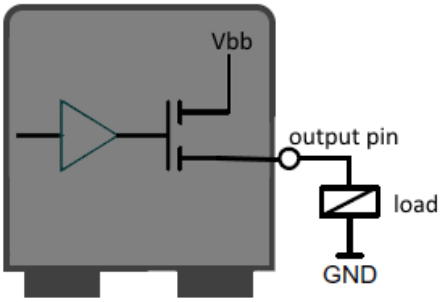
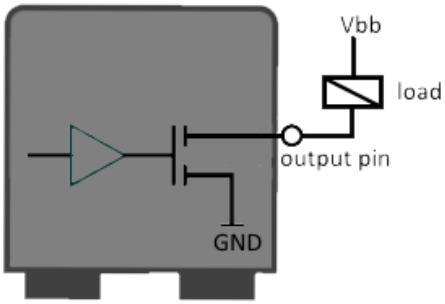
General Output Configuration

Option	Values	Description
Configuration	Digital Plus	Digital output switches supply voltage. (Overload protection disables the output if the maximum current is higher than 4500 mA.) 
	Digital GND	Digital output switches ground. (Overload protection disables the output if the maximum current is higher than 4500 mA.) 
	PWM	PWM output (= digital plus output in pwm mode) (Overload protection disables the output if the maximum current is higher than 4500 mA.)
	PWM-I	PWM output current-controlled (= digital plus output in current-controlled pwm mode) (Overload protection disables the output if the maximum current is higher than 4500 mA.)
Behaviour	Momentary	momentary, non-latching button
	Latching	Latching switch
	Pilot Valve	This output will be used as pilot valve. It will be combined with other outputs as their pilot valve.
Color ON Color OFF	Grey/Silver Red Green Yellow Blue Cyan Magenta	Select the colour to represent the ON- and OFF-state of the output in the main data mask.

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Combination Options

Option	Values	Description
XOR-Output [output combination]	0 = no relation 1..6 = relation with output x	This option establishes a XOR-relationship between the current output and this configurable XOR-output. This means that only one of these both can be ON. ➢ If the current output has the configured behaviour “pilot valve”, a XOR-combination is not possible.
Pilot Valve [output combination]	0 = no relation 1..6 = relation with output x	This option establishes relationship between the current output and its pilot valve output. This means that both outputs will be switch together. (current output ON -> pilot valve ON) ➢ If the current output has the configured behaviour “pilot valve”, a “Pilot Valve”-combination is not possible. ➢ A relationship with a “Pilot Valve” output can only be established if the desired pilot valve output is already configured as “behaviour = Pilot Valve”.
Switch Off – Input [input combination]	0 = no relation 1..5 = relation with input x	This input will turn OFF the current output. (Dependency with the desired input signal utilization.) ➢ Only possible with a Digital Input.
Switch Off - Signal	Low	Output switch off command as long as the input is (logical) LOW = FALSE.
	High	Output switch off command as long as the input is (logical) HIGH = TRUE.
	Rising	Output switch off command once with a rising edge of the input signal. (Transition from FALSE -> TRUE)
	Falling	Output switch off command once with a falling edge of the input signal. (Transition from TRUE -> FALSE)
Switch On – Input [input combination]	0 = no relation 1..5 = relation with input x	This input will turn ON the current output. ➢ Only possible with a Digital Input. ➢ Only possible with an output configured as: behaviour = “Momentary”.

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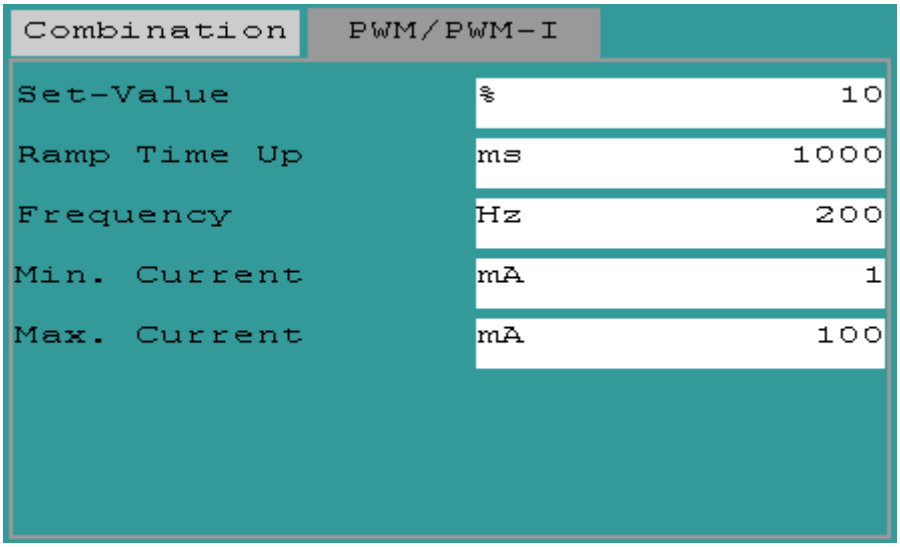
PWM / PWM-I (PWM current-controlled) settings

The PWM/PWM-I settings tab is only visible if the current output is configured as “PWM” or “PWM-I”. Within the PWM/PWM-I settings the Min./Max. Current settings are only possible with an output configuration = “PWM-I”.



Option	Values	Description
Set-Value	0...100 %	Output setpoint value is always scaled in 0 – 100%. This setpoint can also be changed by the user on the main data mask. PWM: 0 – 100% of PWM duty cycle PWM-I: [0 – 100%] = [Min. Current – Max. Current]
Ramp Time Up	50 … 5000 ms	When switching ON, the output value is increasing with a time-dependent ramp function to reach the Set-Value.
Frequency	20…250 Hz	Frequency of the PWM output signal.
Min. Current [only PWM-I]	0…4000 mA	Min. current value to start the output value range with. [min. current = 0% set-value)
Max Current [only PWM-I]	0…4000 mA	Max. current value to end the output value range with. [max. current = 100% set-value)

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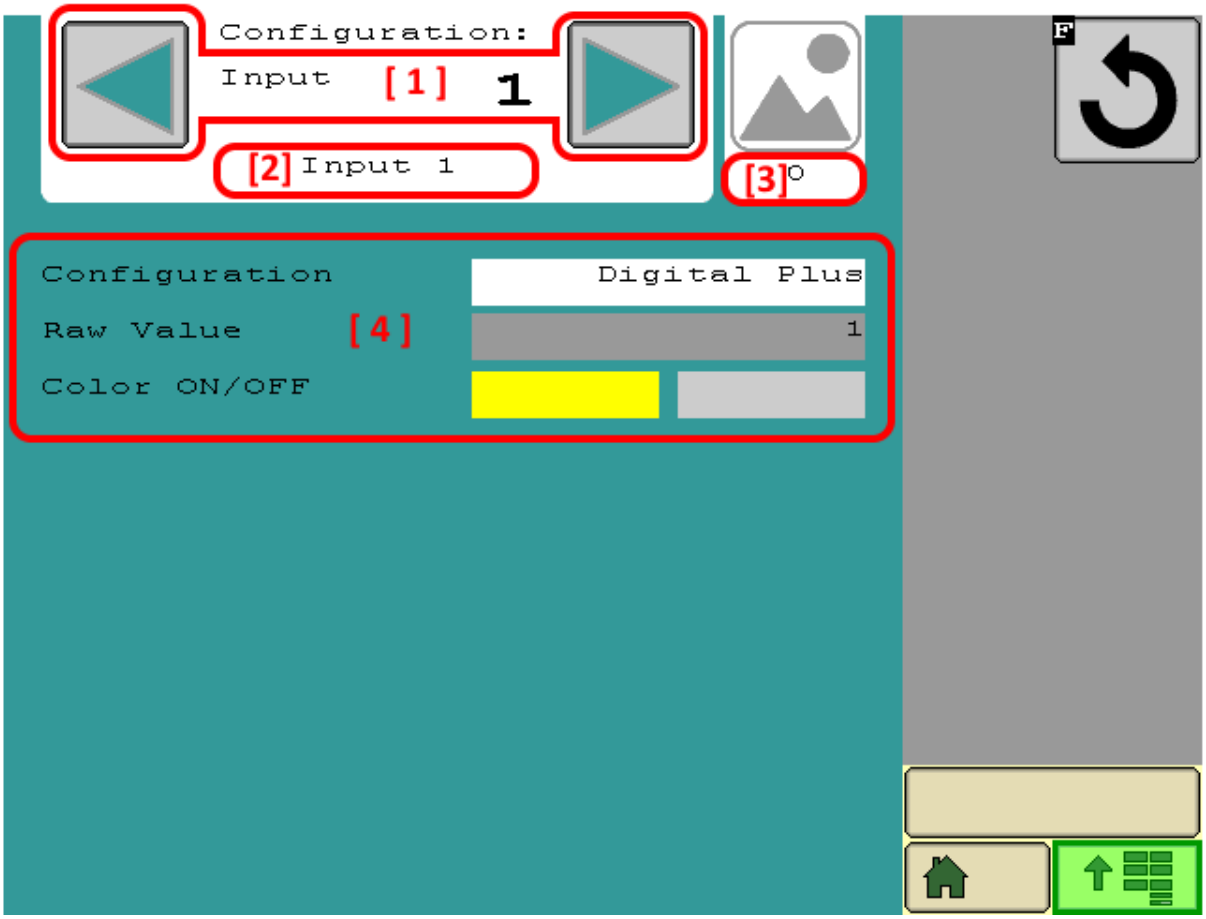
4.2.4 Input Configuration Data Mask

The user can configure each input on the Input Configuration data mask.

Example with a default “digital input” configuration:



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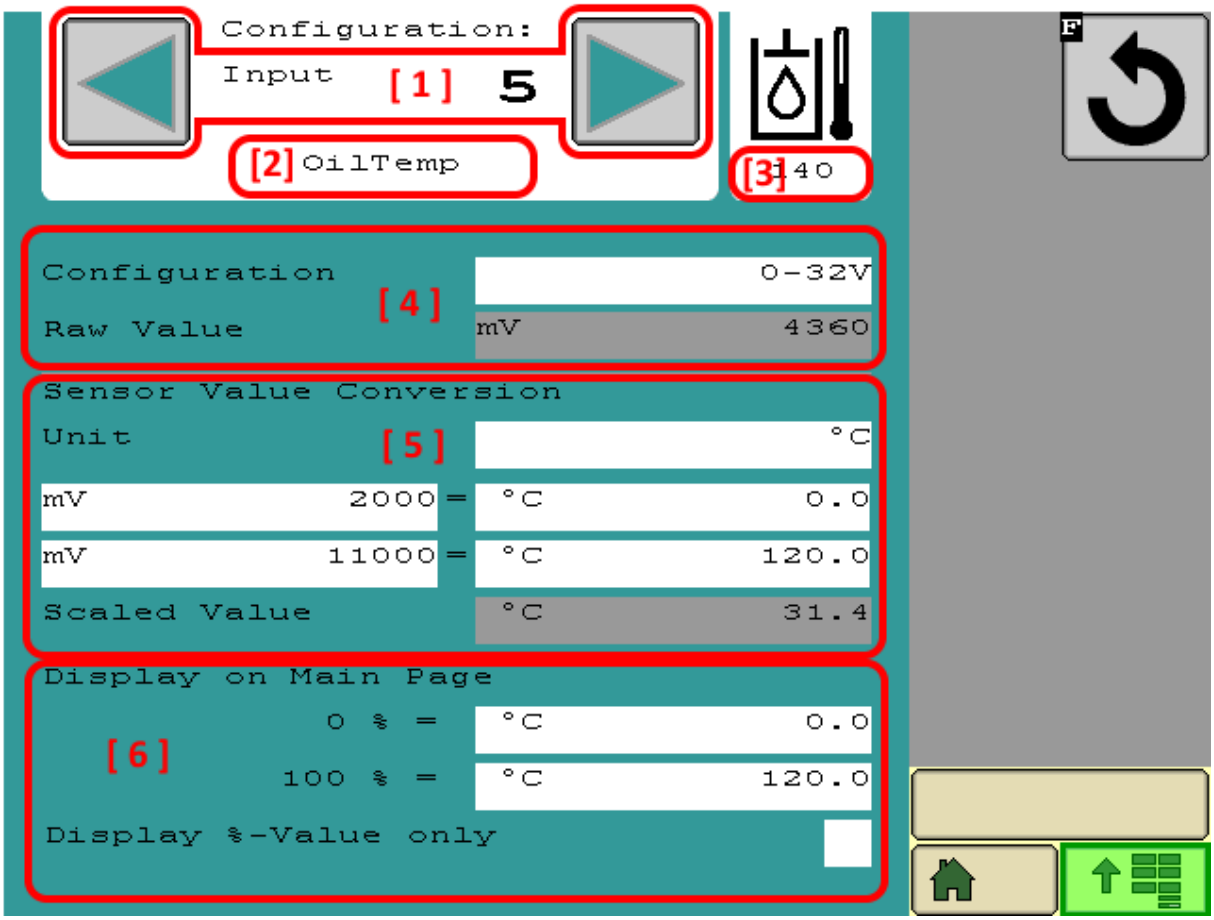
Example with an analog input configuration:



[1]	Switch the input shown on the configuration data mask.
[2]	Description text for this input. [max. 20 characters]
[3]	Configure an icon for this input. Please see Annex 1 for a list of available icon index numbers.
[4]	General Input configurations.
[5]	Sensor Value Conversion
[6]	Configuration of the bargraph shown on the main data mask.

User Operation – Softkeys	
	Save the changed configuration data and go back to info data mask.

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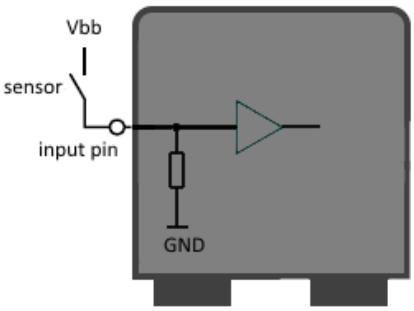
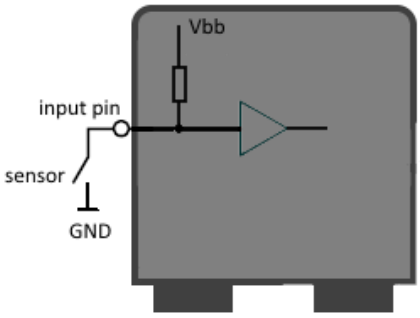
General Input Configuration

Option	Values	Description
Configuration	Digital Plus	Digital input for reading switch connected to power supply (Vcc). (internally pull-down connected) 
	Digital GND	Digital input for reading switch connected to ground. (internally pull-up connected) 
	0 - 10 V	Analog input 0 – 10 V
	0 – 32 V	Analog input 0 – 32 V
	4 -20 mA	Analog input 4 – 20 mA
	Frequency	Fast “digital plus” input for frequency measurement [0 - 30 kHz]
Raw Value	0/1 (digital in) mV, uA, 1/10 Hz	This is the displayed raw input value. The user is able to verify the raw sensor input value. ➢ If the configuration type of the input is changed, this value disappears because a controller restart is necessary to (re-)configure the hardware input.
Colour ON Colour OFF	Grey/Silver Red Green Yellow Blue Cyan Magenta	Select the colour to represent the ON- and OFF-state of the input in the main data mask.

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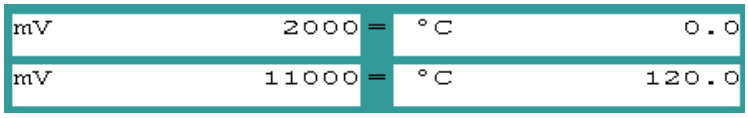
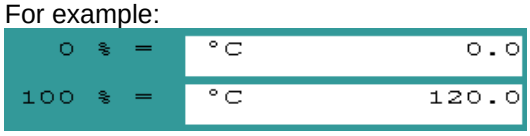
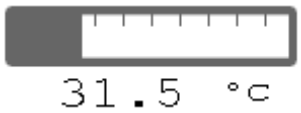
Sensor Value Conversion

Option	Values	Description
Unit	Text value [max. 10 characters]	Text value to define the unit of the converted sensor signal, e.g. 4-20 mA pressure sensor is converted to 0-100 bar.
Linear transformation of the sensor value		The sensor raw value is converted via a linear transformation. Therefore the user configures the linear function with “2 points” of the line. That means a raw value corresponds to a converted value. Example: voltage measurement is converted to a temperature value 
Scaled Value	Unit as defined in “Unit”	This is the displayed converted input value. The user is able to verify the linear input value transformation.

Display on Main page

Option	Values	Description
Configuration of the bargraph shown on the main data mask		The bargraph value range is always 0 – 100 %. The user has to define a corresponding “Scaled Value” range. For example: 
Display %-Value only	0/1	Together with the bargraph a decimal value is shown on the main page. If this option is enabled the % value is shown.  Otherwise the “Scaled Value” with its unit “Unit” is shown. 

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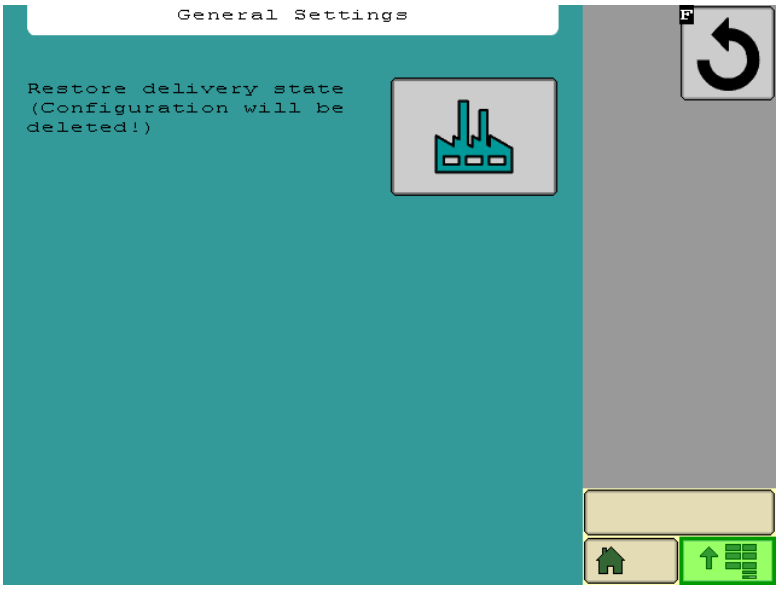
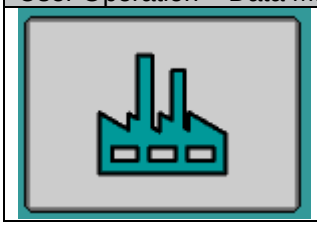
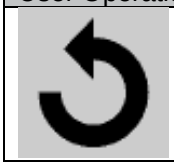
4.2.5 General Settings Data Mask



User Operation – Data Mask	
	Restore delivery state. This option will reset the b-ISOBUS IO Gateway to factory defaults (as it was supplied by b-plus). All user configurations will be deleted!

User Operation – Softkeys	
	Go back to info data mask.

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5 Option: Task Controller Client

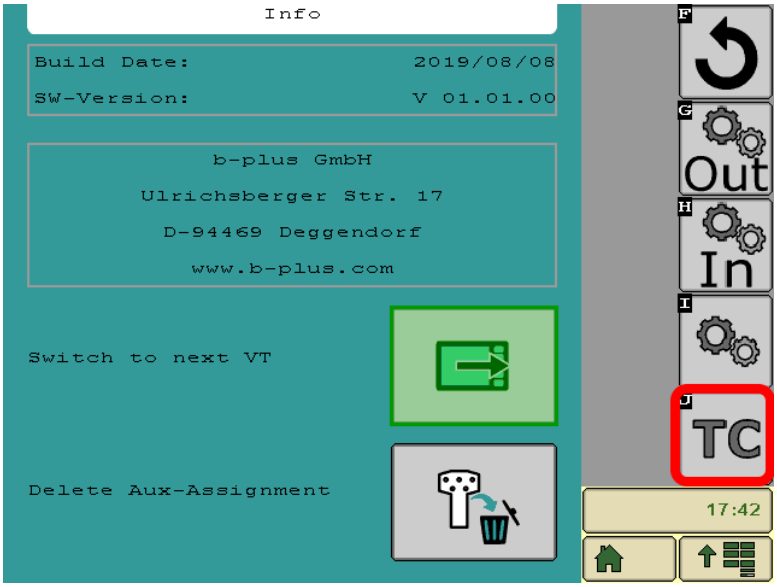
The b-ISOBUS IO Gateway is also available as version with optional Task Controller Client functionality.
The user can choose these options:

- Task Controller Client only reporting its “Actual Work State”

- Task Controller Client Section Control
  - with up to 6 sections (using only the b-ISOBUS IO Gateway)
  - with up to 24 sections (using the b-ISOBUS IO Gateway (=Master) with additional OUTPUT Slave modules)

Info Data Mask

On the Info Data Mask an additional softkey is displayed if your IO Gateway device comes with an optional Task Controller Client license.



User Operation – Softkeys	
TC	Go forward to Task Controller Client Info and Configuration.

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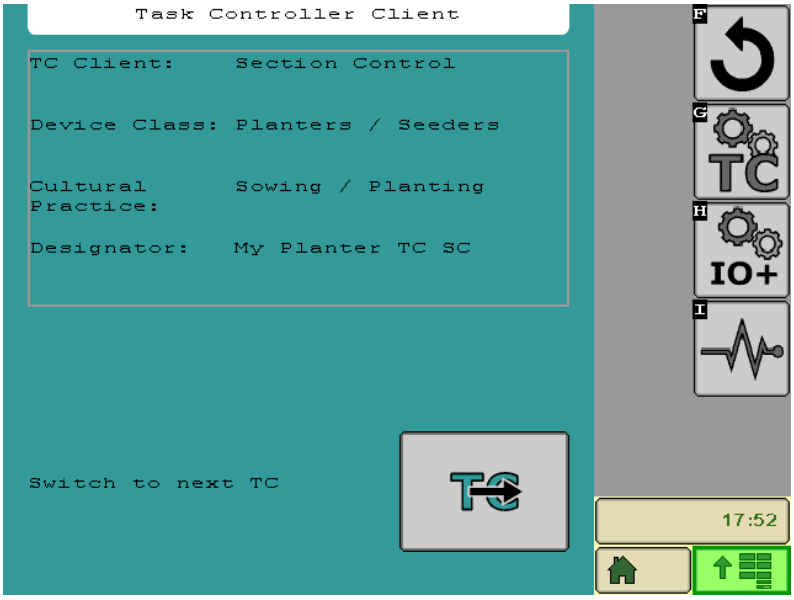
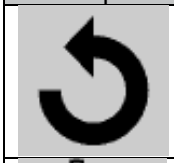
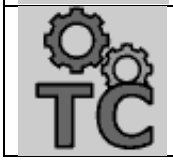
5.1 TC Client Info Data Mask

The “Task Controller Client” info data mask presents the main configuration values to identify your TC Client on the ISOBUS. The user can find the “Next TC” option on the data mask and several softkeys to navigate. All of the further Task Controller Client configuration options are protected by password (see Password Data Mask).



User Operation – Data Mask	
	Switch to next TC If there are more Task Controllers (TCs) available in the ISOBUS network the user can move the b-ISOBUS IO Gateway TC Client application to the next TC by pressing the button. (Next TC means the next available TC in the address claim name table.) The application will disconnect from the current connected TC, disappear for some seconds and connect to the other TC. The gateway remembers its last successful TC connection. After a restart the gateway waits for its preferred TC connection for 30 seconds. After this time, it will connect to the next available TC.

User Operation – Softkeys	
	Go back to Info data mask.
	Go forward to Task Controller Client Configuration. If the menu isn’t unlocked by password yet, the user has to enter this first.

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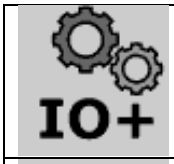
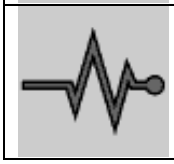
	Go forward to IO Extension TC configuration data mask If the menu isn't unlocked by password yet, the user has to enter this first.
	Go forward to TC Diagnosis Information data mask.

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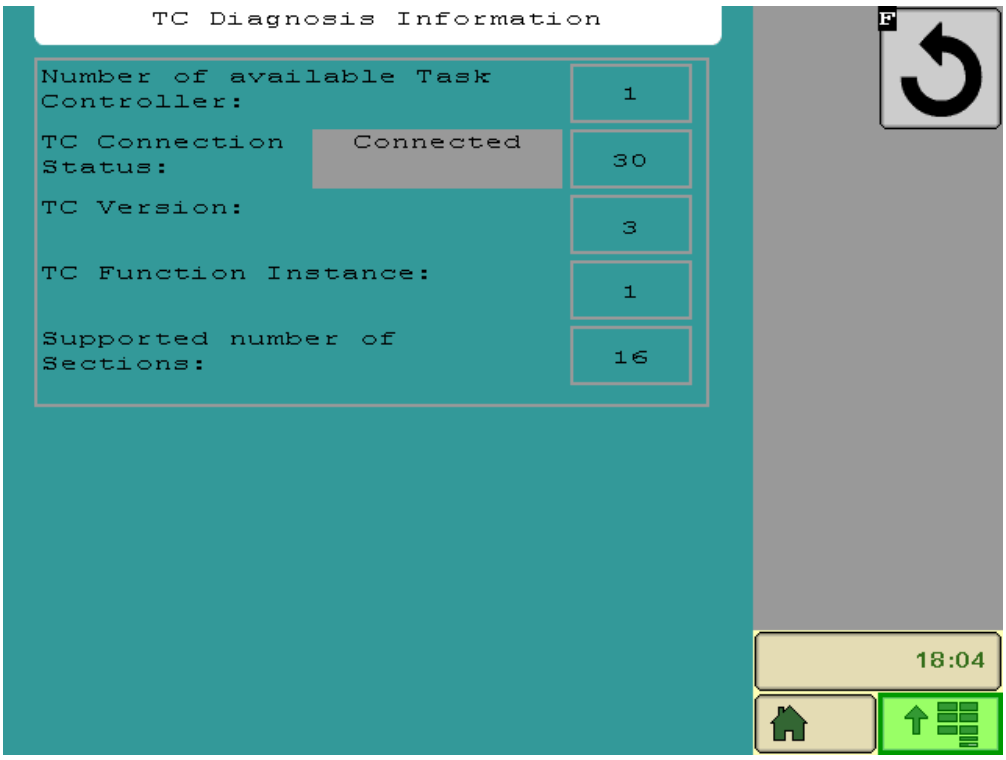
5.2 TC Diagnosis Information Data Mask

The “TC Diagnosis Information” data mask shows detailed information about the TC Server in the ISOBUS network and the connection status.

- Number of TC Server available on the ISOBUS
- The b-ISOBUS IO Gateway connection status with a TC Server:
  - Wait for connection
  - Establish connection
  - Connected
  - Disconnect
- TC Version of the connected TC Server
- TC function instance of the connected TC Server
- Supported number of sections by the connected TC Server



User Operation – Softkeys	
	Go back to TC Client Info data mask.

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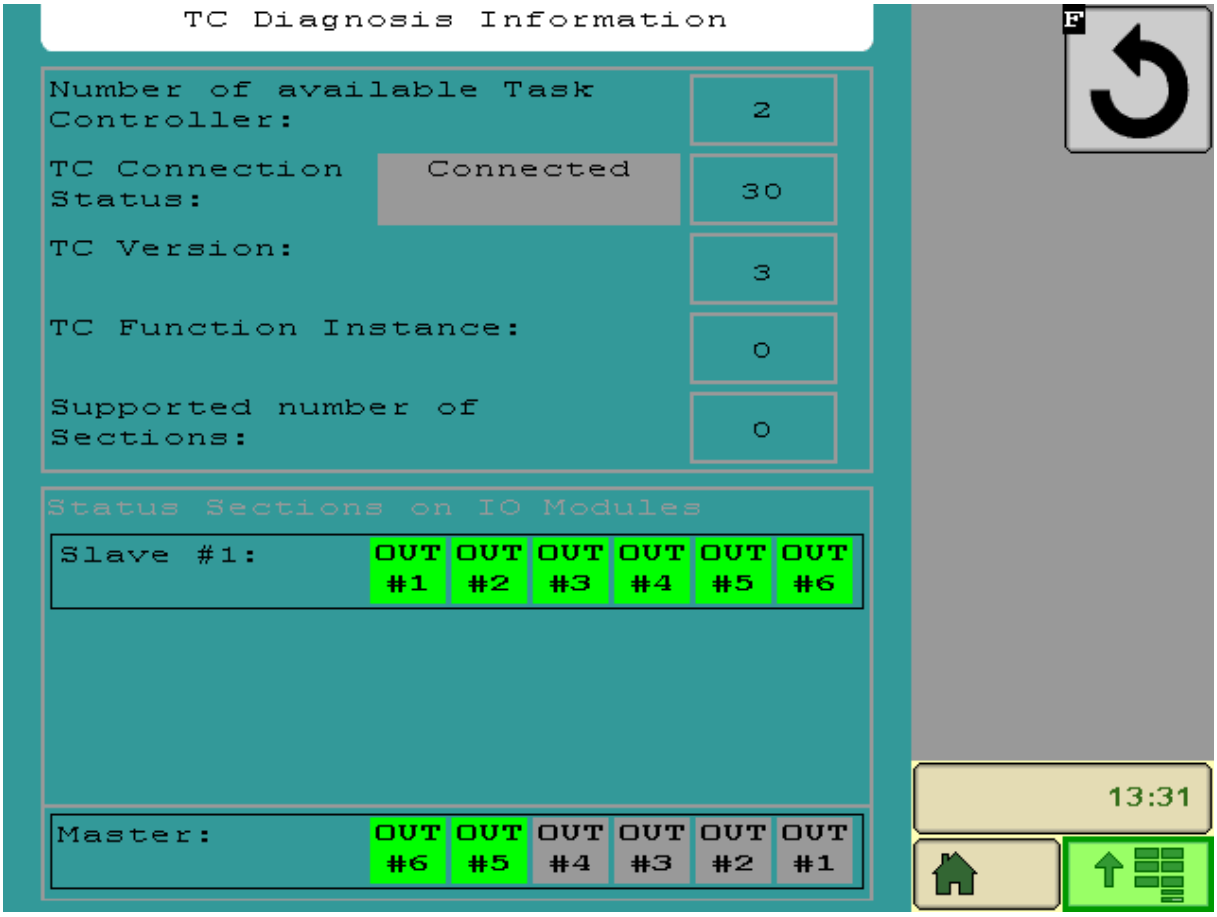
The “TC Diagnosis Information” data mask shows additional status information of the sections if the IO Gateway system is configured for working with additional IO Extension Slave modules.

This is an example with 1 slave module and the master (= b-ISOBUS IO Gateway) itself. The system is configured to work with 8 sections. So, 6 sections on the slave module #1 and 2 sections on the master module. Here in this picture all 8 sections are active.



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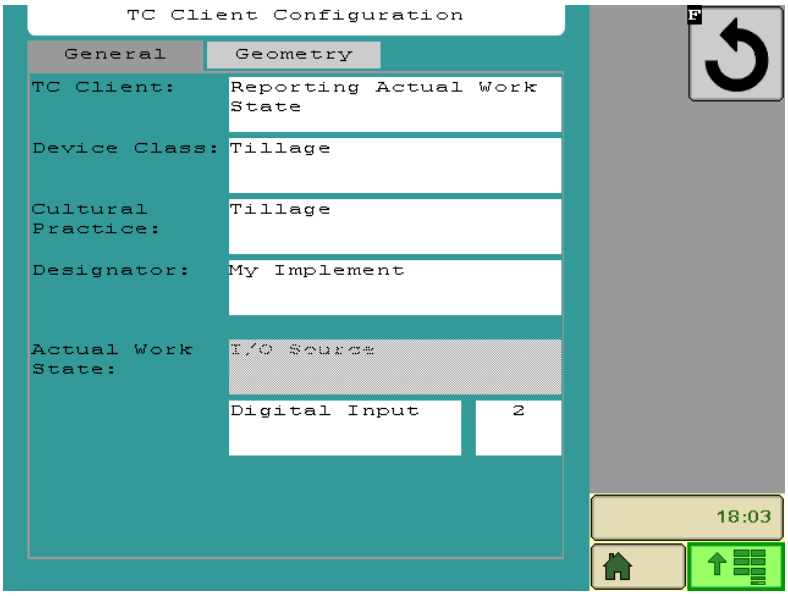
5.3 TC Client “Reporting Actual Work State”

The task controller type “Report Actual Work State” only reports the Actual Work State of the implement to the task controller server.

5.3.1 Configuration

5.3.1.1 General Configuration

Set the general configuration of the TC Client.



TC Client	Set the TC Client type to “Reporting Actual Work State”. Options: - No TC Client - Reporting Actual Work State - Section Control
Device Class	Set a device class for your implement. Reference: https://www.isobus.net/isobus/nameFunction > Industry Group = 2 = Agricultural and Forestry Equipment > Device Class = Vehicle System
Cultural Practice	Set a value for Actual Cultural Practice. Reference: https://www.isobus.net/isobus/dDEntity Actual Cultural Practice = DDI 179
Designator	Set a name for your TC Client (max. 30 characters).

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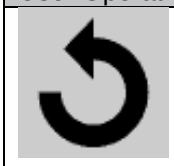
Actual Work State	Select an I/O option for Actual Work State: A digital input or an output can be selected to indicate the work state: 0 = disabled/off 1 = enabled/on 3 = undefined (if no input or output channel is selected) Reference: https://www.isobus.net/isobus/dDEntity Actual Work State = DDI 141

User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

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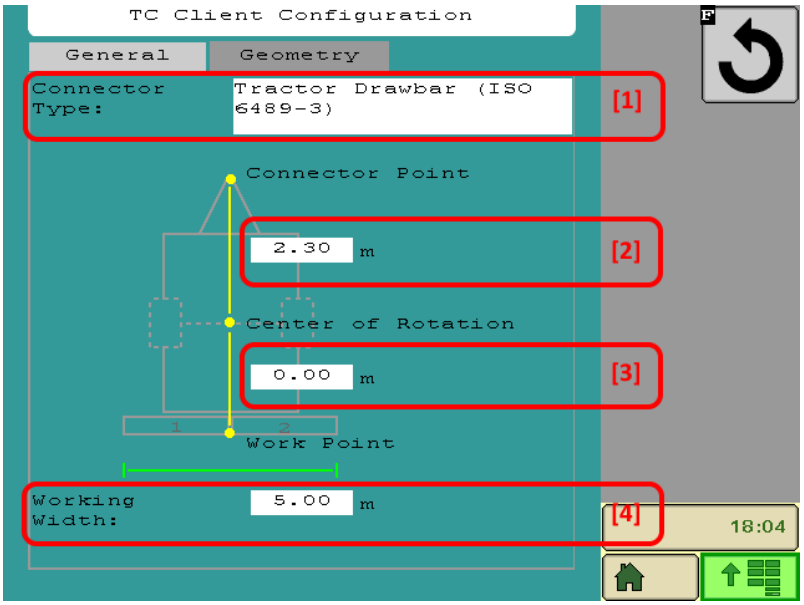
5.3.1.2 Geometry

Configure the geometry information of the implement and its connection type.



[1]	Select a connector type (default = tractor drawbar) Reference: https://www.isobus.net/isobus/dDEntity Connector Type = DDI 157
[2]	Set the distance between the connection point and the “center of rotation” point of the implement.
[3]	Set the distance between the “center of rotation” point and the work/application point of the implement. The distance can also be zero.
[4]	Set the working width of your implement. This is a fixed value.

User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

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5.3.2 Operating the TC Client

The TC client “Reporting Actual Work State” of the b-ISOBUS IO Gateway will connect automatically to an available Task Controller server on the ISOBUS network.

There is no further user interaction necessary on the b-ISOBUS IO Gateway implement.

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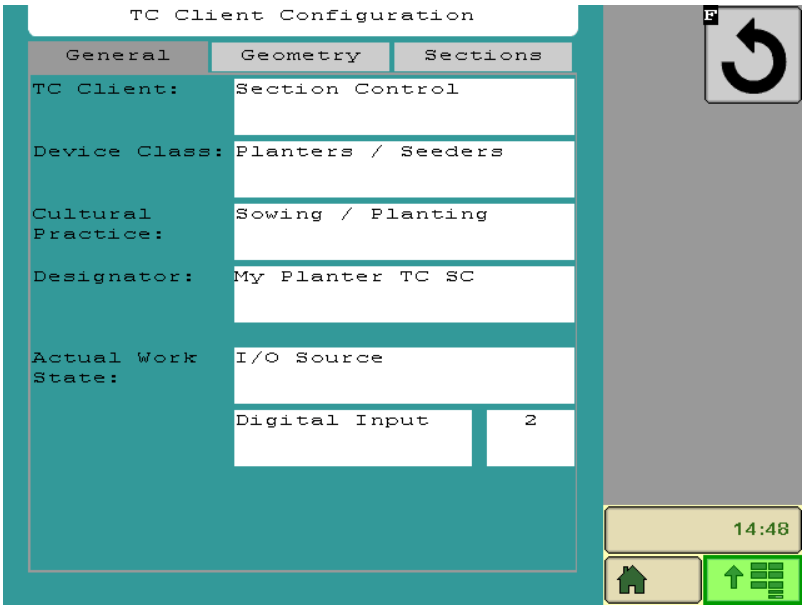
5.4 TC Client “Section Control”

The task controller type “Section Control” provides full section control functionality for up to 6 sections. The tractor needs to be equipped with a task controller system capable of section control.

5.4.1 Configuration

5.4.1.1 General Configuration

Set the general configuration of the TC Client Section Control.



TC Client	Set the TC Client type to “Section Control”. Options: - No TC Client - Reporting Actual Work State - Section Control
Device Class	Set a device class for your implement. Reference: https://www.isobus.net/isobus/nameFunction > Industry Group = 2 = Agricultural and Forestry Equipment > Device Class = Vehicle System
Cultural Practice	Set a value for Actual Cultural Practice. Reference: https://www.isobus.net/isobus/dDEntity Actual Cultural Practice = DDI 179

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<table>
<tr><td>Designator</td><td>Set a name for your TC Client (max. 30 characters).</td></tr>
<tr><td>Actual Work State</td><td>Select an option for Actual Work State:
<table>
<tr><td>Always ON</td><td>The TC client always reports Actual Work State = 1 = enabled/on.</td></tr>
<tr><td>I/O Source</td><td>With this option a digital input or an output can be selected to indicate the work state:
0 = disabled/off
1 = enabled/on
3 = undefined (if no input or output channel is selected)</td></tr>
<tr><td>Auto</td><td>Actual Work State = 1 = enabled/on if at least one section is enabled. Otherwise the work state = 0 = disabled/off.

If problems occur with a TC server section control and this option, please select option “Always ON”.</td></tr>
</table>
Reference:
https://www.isobus.net/isobus/dDEntity
Actual Work State = DDI 141</td></tr>
</table>

User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

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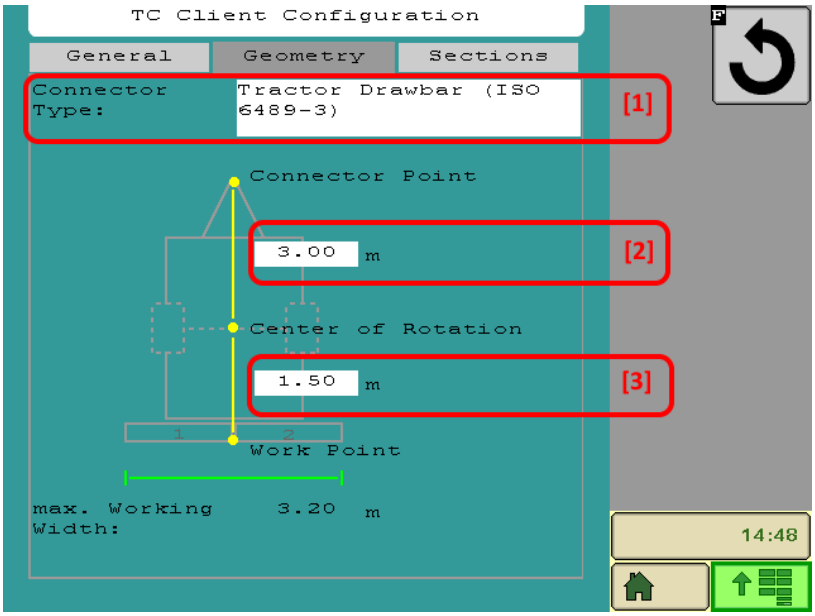
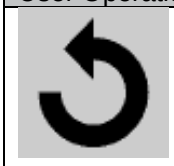
5.4.1.2 Geometry

Configure the necessary geometry of the implement and its connection type.



[1]	Select a connector type (default = tractor drawbar) Reference: https://www.isobus.net/isobus/dDEntity Connector Type = DDI 157
[2]	Set the distance between the connection point and the “center of rotation” point of the implement.
[3]	Set the distance between the “center of rotation” point and the work/application point of the implement. The distance can also be zero.
	The max. working width is calculated from the configured working width(s) of the section(s).
	The order of the sections is defined from left to right in the driving directon, where the leftmost section is section 1.

User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

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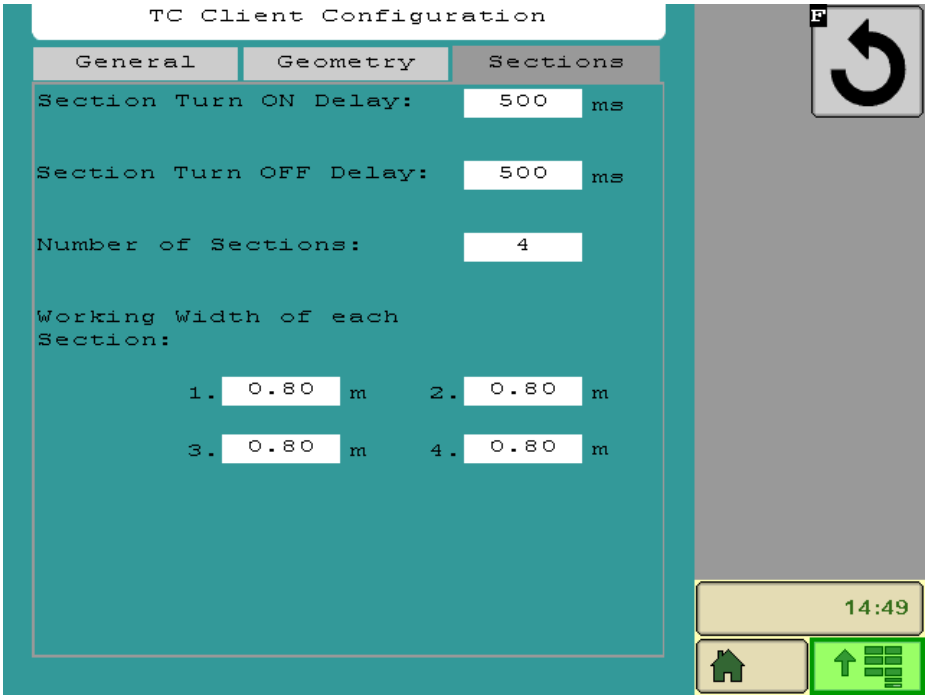
5.4.1.3 Sections

Configure the number of sections and the required information.

Each section is connected to one of the outputs of the b-ISOBUS IO Gateway (see section link table).



Section Turn ON Delay	Set a delay time for switching on a section.
Section Turn OFF Delay	Set a delay time for switching off a section.
Number of Sections	Set the number of sections [1 to 6 sections]. The order of the sections is defined from left to right in the driving directon, where the leftmost section is section 1.
Working Width	Set the working width of each section. Please consider that the sections are placed exactly next to each other (no gap between two sections) and without overlap. 

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User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

5.4.1.3.1 Section link table

Each section is connected to one of the outputs of the b-ISOBUS IO Gateway.
The order of the used outputs starts with the first output (output 1).

For example: 4 sections are configured. Link to the outputs: section 1 is connected to output 1, section 2 to output 2, section 3 to output 3 and section 4 to output 4. Output 5 and 6 are not controlled by the section control.

The sections are linked to the outputs according to the following scheme:

Module	Output	Section link
b-ISOBUS IO Gateway	Out 1	Section 1
	Out 2	Section 2
	Out 3	Section 3
	Out 4	Section 4
	Out 5	Section 5
	Out 6	Section 6

5.4.1.4 Output Configuration

The output configuration has to be done as described in “Output Configuration Data Mask”.

All configuration types and behaviour options are possible for an output that is used as a section, with one exception: a section output should not be configured as (behaviour) “Pilot Valve”.
All combination options for the output are available.
It is the responsibility of the user to choose a reasonable configuration and to evaluate the behaviour of the implement!

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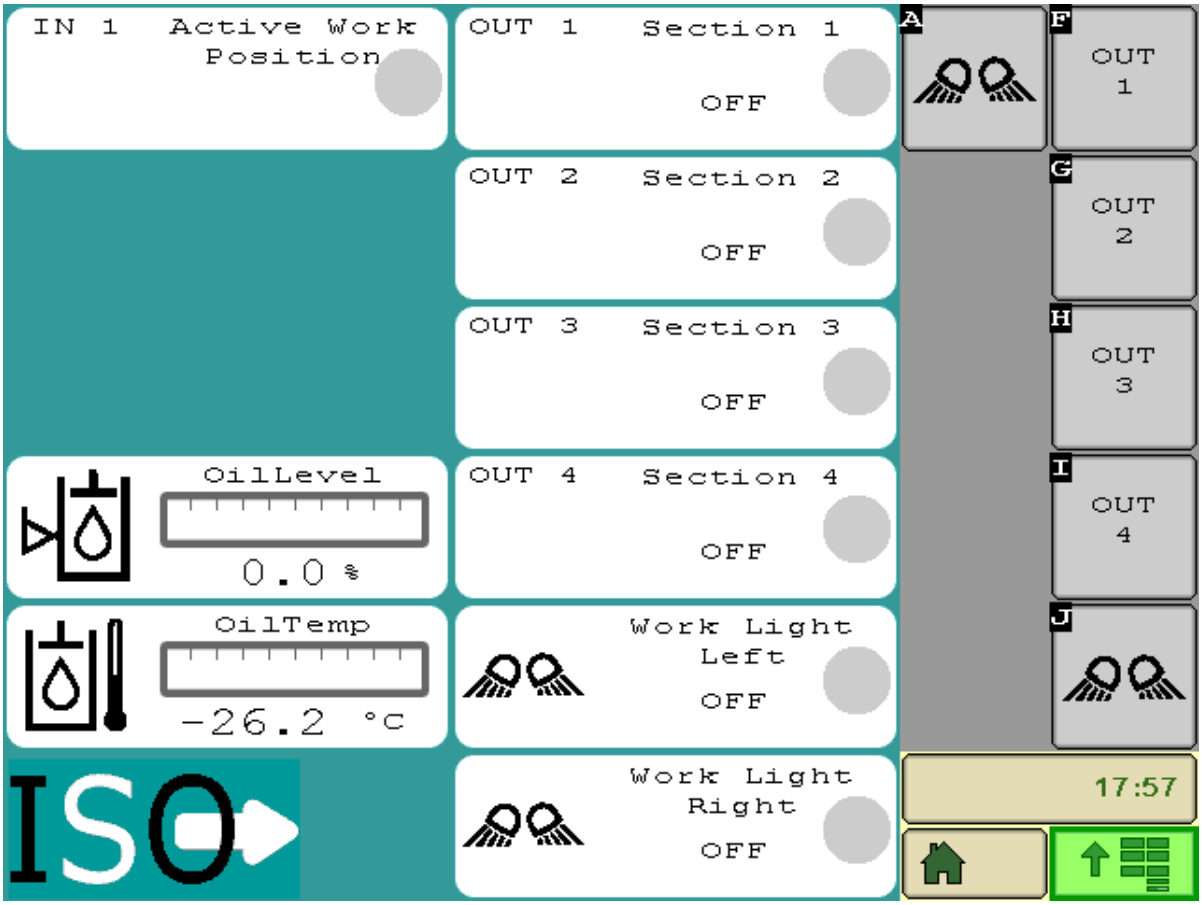
5.4.2 Operating the TC Client

The TC client of the b-ISOBUS IO Gateway will connect automatically to an available Task Controller server on the ISOBUS network.

Here an example:
The example was configured in the “configuration” part, just before. It is an implement with 4 sections, the other two outputs are used to switch work lights. A digital input indicates the actual work state and two analog inputs are configured for measurement of the oil level and oil temperature.

This is the main data mask in normal operation mode (no TC Server section control active):



The operator can turn on / off each output by pressing the corresponding softkey or via Auxiliary Control (AUX-N functions).

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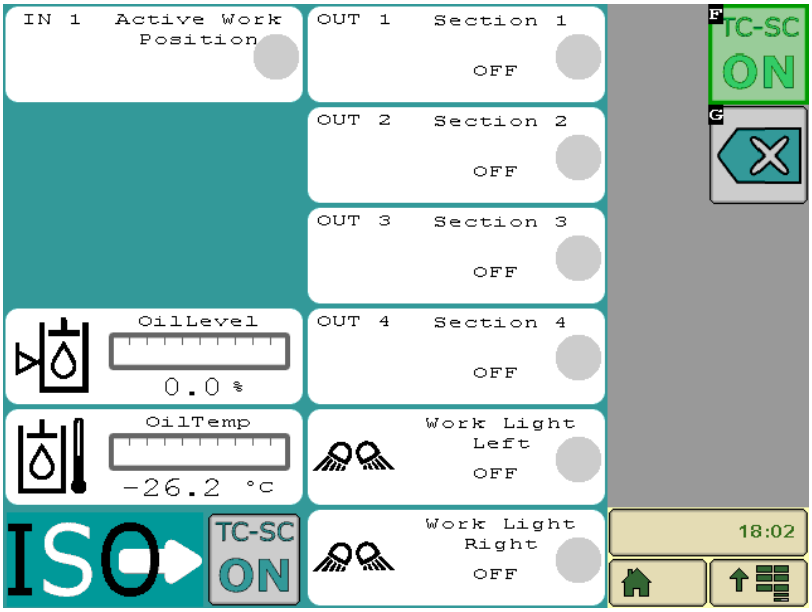
The Task Controller server wants to start section control:

Each time the task controller wants to start controlling the implement by section control, the operator has to permit the section control of the implement.



User Operation – Data Mask	
TC-SC ON	Permission to start section control. The task controller has now the control of the sections = the corresponding outputs.

User Operation – Softkeys	
TC-SC ON	Permission to start section control. The task controller has now the control of the sections = the corresponding outputs.
	Permission denied to start section control on the implement. Implement remains in normal operation mode.

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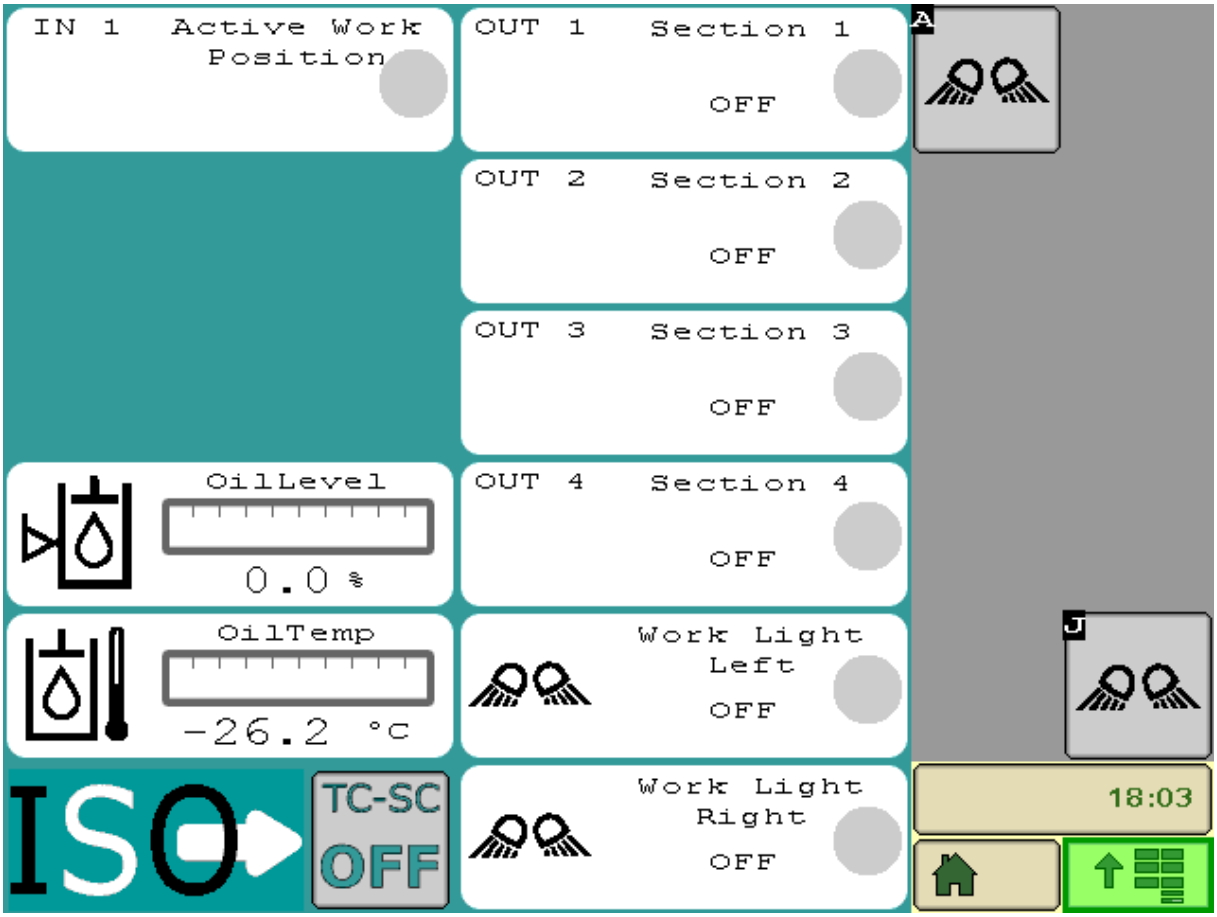
The main data mask in section control operation mode (section control active/permitted):



In active section control mode the operator can't control the section outputs anymore.
The 4 softkeys to switch output 1 – 4 are not available. Auxiliary Control (AUX-N functions) for the 4 section outputs is also deactivated.
The outputs 5 and 6 are not a section and remain for normal user operation.

The operator is able to stop section control mode of the implement by pressing the "TC-SC OFF" button.

User Operation – Data Mask	
TC-SC OFF	Stop section control mode of the implement. Go back to normal operation mode.

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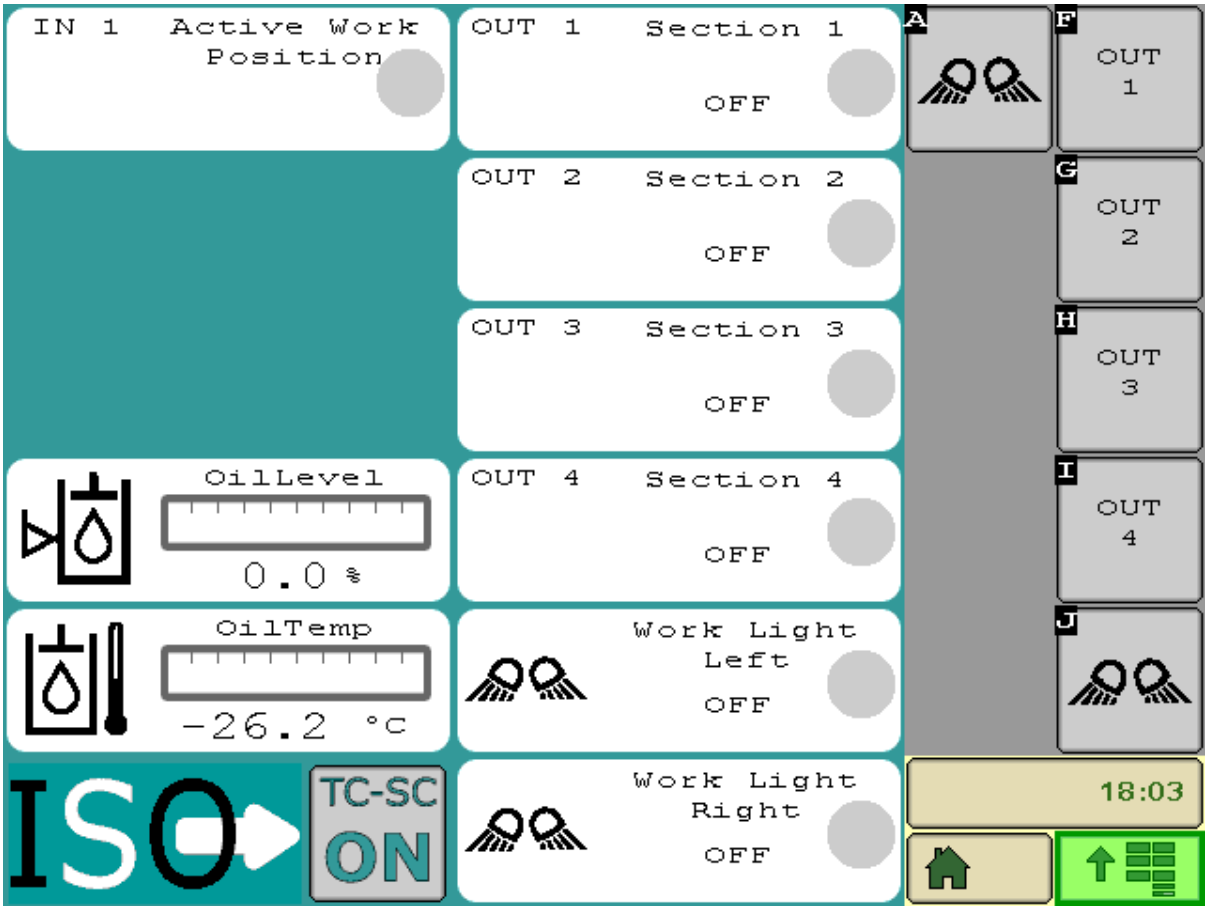
The main data mask in normal operation mode (no section control allowed by user on the IO Gateway):

The main data mask will display this after:

- Permission denied to start section control on the implement (by user) and the TC Server is still ready to start section control operation

- Stop section control mode of the implement (by user) and the TC Server is still ready to start section control operation



User Operation – Data Mask	
TC-SC ON	Permission to start section control. The task controller has now the control of the sections = the corresponding outputs.

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5.5 TC Client “Section Control” with additional slave modules

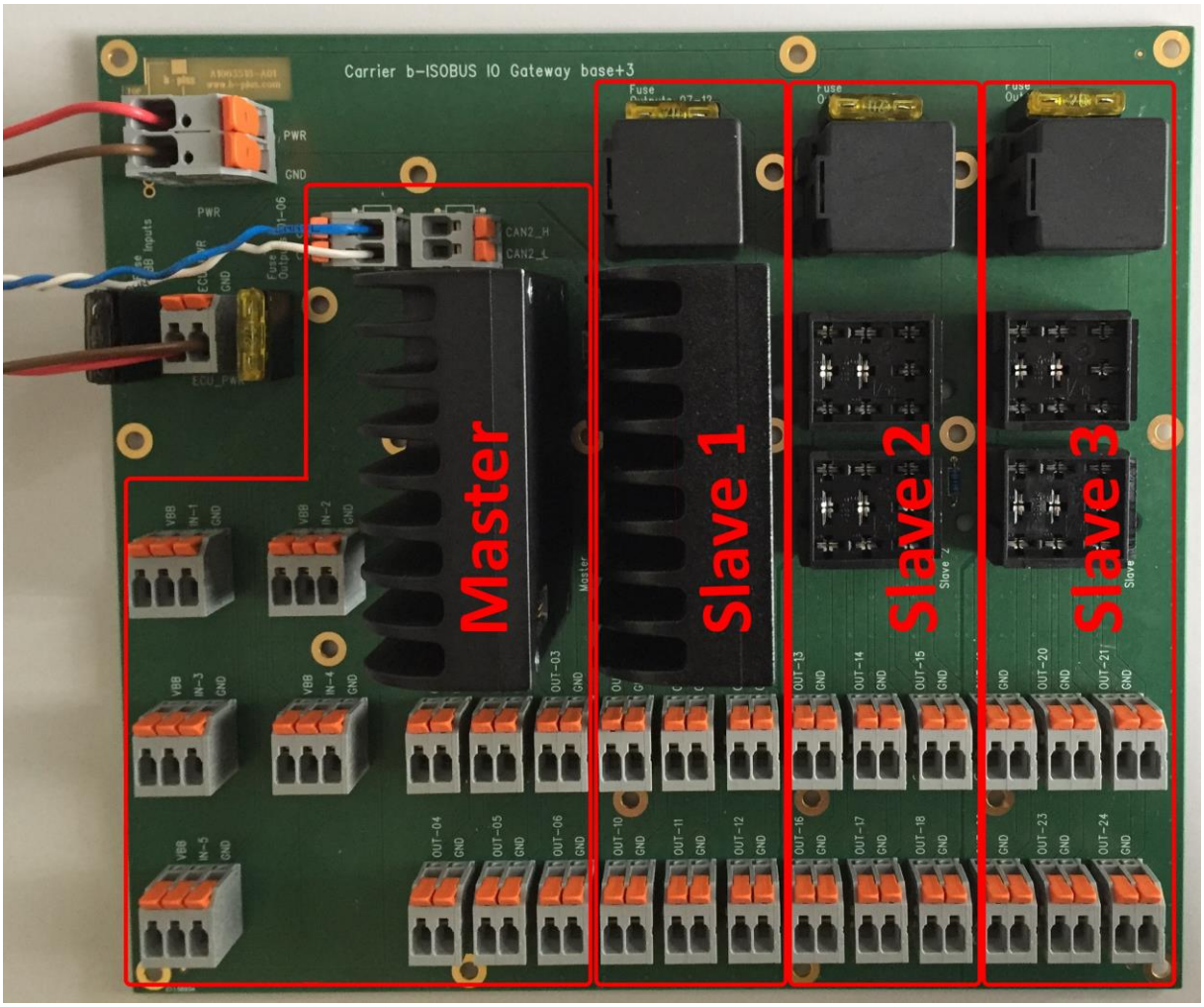
This task controller option is also of type “Section Control” to provide full section control functionality for up to 24 sections together with additional IO Extension slave modules.

The tractor needs to be equipped with a task controller system that allows section control and supports the configured number of sections.

5.5.1 IO Extension with slave modules

The b-ISOBUS IO Gateway (acts as master) can be used in combination with 1 (or up to 3) IO Gateway Slave modules on one of the IO Gateway Carrier Board types.

This example: Carrier Board (base+3) with a b-ISOBUS IO Gateway master module and one additional IO Gateway slave module.



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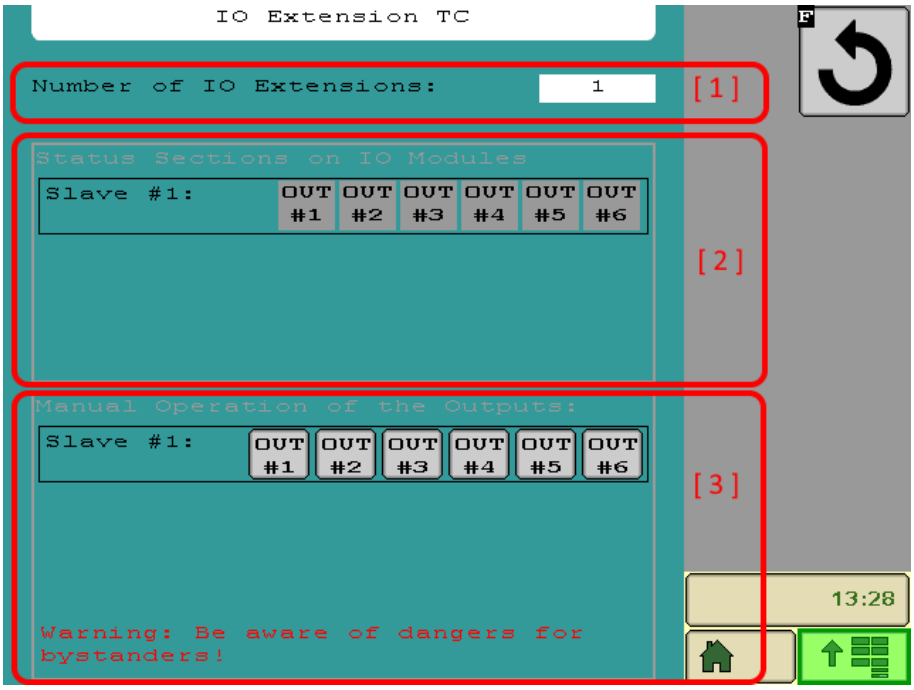
5.5.1.1 IO Extension Configuration

Configure the number of IO Extension slave modules in your system.



[1]	Select the number of IO Extension slave modules. Valid range: [0 … 3]
[2]	Status display of each output (section) on each configured slave module. Or CAN communication error is shown.
[3]	The user can operate each output on the slave modules manually for testing purpose. **Warning:** Be aware of dangers for bystanders when operating the outputs manually!

User Operation – Softkeys	
	Save the changed configuration data and go back to TC Client info data mask.

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5.5.2 Configuration

5.5.2.1 General Configuration

Please see 5.4.1.1 General Configuration.

5.5.2.2 Geometry

Please see 5.4.1.2 Geometry.

5.5.2.3 Sections

Please see 5.4.1.3 Sections.

Modifications:

Each section is assigned to one of the outputs in the system setup (see section link table).

Number of Sections	Set the number of sections. Possible range [1…24]. The max number of sections is limited according to the configured number of IO Extension modules. The number field will be displayed with red background if the configured number of sections is greater than the number of available outputs, because the number of IO Extension modules was decreased. The order of the sections is defined from left to right in the driving directon, where the leftmost section is section 1.

5.5.2.3.1 Section link table

Each section is connected to one of the outputs of the b-ISOBUS IO Gateway (master) or the IO Extension slave modules.

The order of the used outputs starts with the first output (output 1) on the first IO slave module and is continued on the second and third IO slave module (if available).

The remaining sections that can't be assigned to a slave module are linked to the master outputs in descending order.

E.g. master output 6 = section 7, master output 5 = section 8, …

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The sections are linked to the outputs according to the following scheme:

Module	Output	Section link	
IO Gateway Slave 1	Out 1	Section 1	
	Out 2	Section 2	
	Out 3	Section 3	
	Out 4	Section 4	
	Out 5	Section 5	
	Out 6	Section 6	
IO Gateway Slave 2	Out 1	Section 7	If the second slave module is not configured the assignment is continued on the master outputs.
	Out 2	Section 8	
	Out 3	Section 9	
	Out 4	Section 10	
	Out 5	Section 11	
	Out 6	Section 12	
IO Gateway Slave 3	Out 1	Section 13	If the third slave module is not configured the assignment is continued on the master outputs.
	Out 2	Section 14	
	Out 3	Section 15	
	Out 4	Section 16	
	Out 5	Section 17	
	Out 6	Section 18	
b-ISOBUS IO Gateway Master	Out 6	Section X + 1	X = number of slave modules * 6 sections Descending order of the outputs on the master!
	Out 5	Section X + 2	
	Out 4	Section X + 3	
	Out 3	Section X + 4	
	Out 2	Section X + 5	
	Out 1	Section X + 6	

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5.5.2.4 Output Configuration

Please see 5.4.1.4 Output Configuration regarding the outputs on the master module.

Outputs on the IO Gateway master, which are assigned to a section, have to be configured (as “Digital Plus” output) in the output configuration menu by the user. The outputs on the master are not configured automatically.

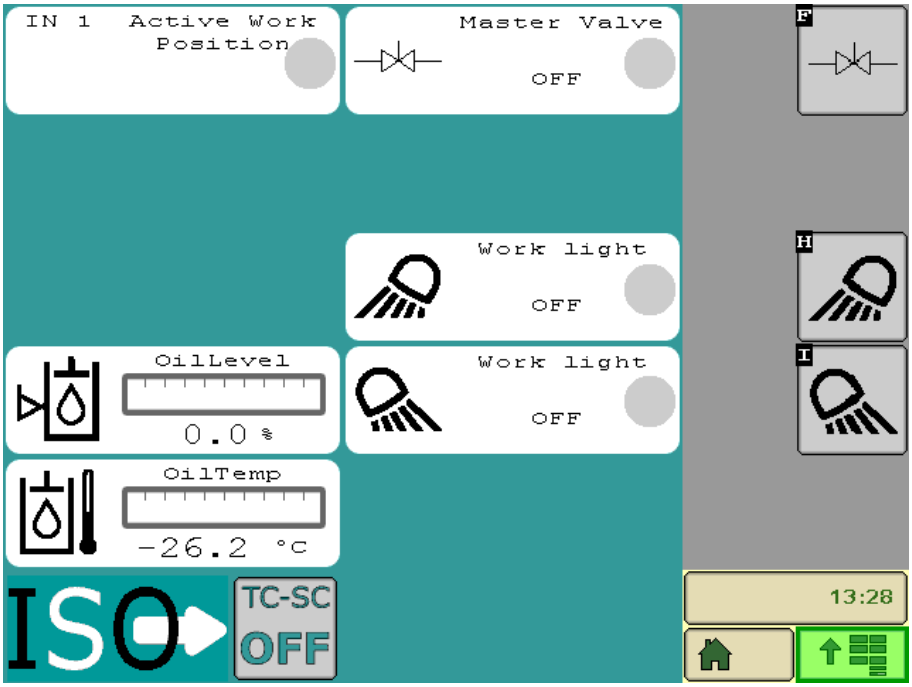
All outputs on the IO Gateway slave module(s) are configured as “Digital Plus” automatically.

5.5.3 Operating the TC Client

Please see 5.4.2 Operating the TC Client.

Modifications:
Outputs on the master module which are used as sections are not shown on the main data mask of the b-ISOBUS IO Gateway.

This is an example with 1 slave module and the master (= b-ISOBUS IO Gateway) itself.
The system is configured to work with 8 sections. So, 6 sections on the slave module 1 and
2 sections on the master module (output 6 and 5).
On the master module: output 1 is a master valve, output 2 is not used and output 3 and 4 are switching work lights.



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6 Annex 1 – Icon List

Index	Icon	
0		No icon selected. A default text will be used.
1		right
2		left
3		down
4		Up
5		Rotate left
6		Rotate right
7		Send away
8		Bring near
Reserved		

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20		Lock
21		Unlock
22		Work light 1
23		Work light 2
24		Work lights 3
25		Master light switch
26		beacon
reserved		
30		Fan
31		Reverse
32		Heater fan

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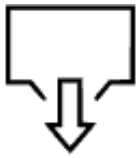
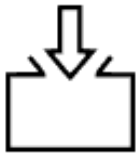
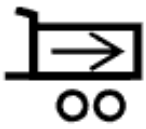
33		Drain
34		Fill
35		Tank Fill
36		Tank drain
reserved		
40		
41		
42		
43		
44		
45		

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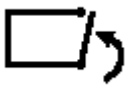
46		
47		Lower bed
48		Raise bed
49		Flip bed
50		Lower bed
51		Hood close
52		Hood open
53		Open bed
54		Close bed
Reserved		
60		

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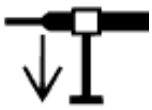
61		
62		Stabilizer
63		Stabilizer
64		Stabilizer up
65		Stabilizer down
66		Stabilizer Out
67		Stabilizer in
68		Stabilizer up
69		Stabilizer down
70		Stabilizer Out
71		Stabilizer in

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72		Front stabilizer up
73		Front stabilizer down
74		Rear stabilizer up
75		Rear stabilizer down
Reserved		
80		Tilt forward
81		Tilt rearward
82		Bucket open
83		Bucket close
84		Grapple open
85		Grapple close

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86		Clamp open
87		Clamp close
88		Circular raw out
89		Circular saw in
90		Winch spool out
91		Winch spool in
92		Front steering
93		Parallel steering
94		Converging steering
95		
96		Hopper extension fold in

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97		Hopper extension fold out
98		Decelerate
99		Accelerate
100		Ladder rack up
101		Ladder rack down
102		Brush rotation +
103		Brush rotation -
104		Wheel up
105		Wheel down
106		
107		

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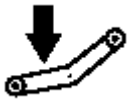
108		Cutter protection
109		converyor belt left
110		converyor belt right
111		
112		
113		
114		
115		
116		
Reserved		
130		Letter „R“

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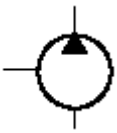
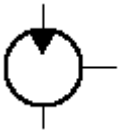
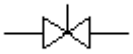
131		Height control left
132		Height control right
Reserved		
140		Hydraulic temeperature
141		Hydraulic pressure
142		Hydraulic oil level
reserved		
150		Hydraulic pump
151		Hydraulic motor
152		
Reserved		

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7 Document Information

7.1 Changes

Version	Date	Editor	Description	Pages
00.10	17.08.2018	SMA	Preliminary version	All
00.11	20.08.2018	JGR/JEG	first correction	All
00.12	17.09.2018	JGR	Input options	5
01.01	23.08.2019	SMA	Task Controller Client option	25-38
01.02	23.09.2019	SMA	Task Controller Client	27, 28
01.03	24.02.2020	SMA	New: 5.2 TC Diagnosis Information Data Mask New: 5.5 TC Client „Section Control“ with additional slave modules	28 f 43 ff

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