FORCAM™ FORCE

Version 5.9

Shop Floor Terminal

Product Description

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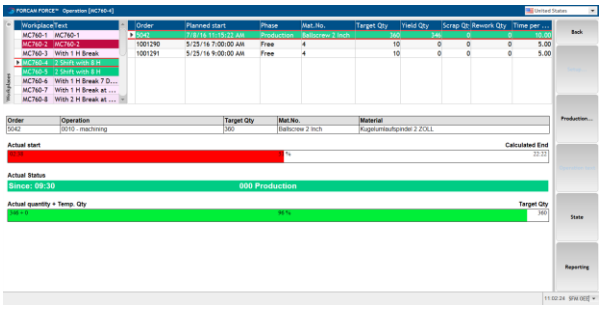
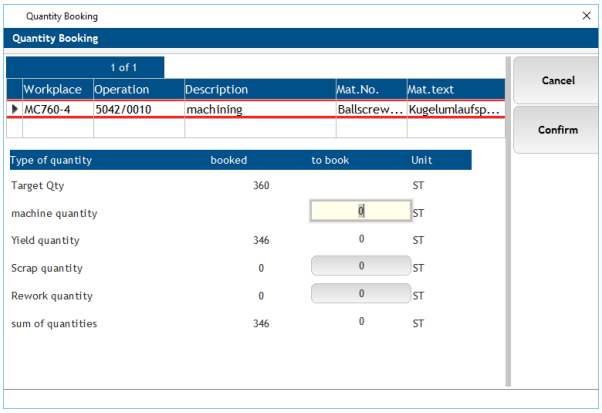
Product Description

FORCAM FORCE™ **Shop Floor Terminal** acts as a central information source for manufacturing staff and allows you to collect to all operational data for the purposes of shop floor management and relaying feedback signals into a higher-level ERP system. Each workplace is allocated a list of planned processes. Details are displayed when selecting individual operations - allowing you to report set-up processes, production, and any disruptions to the operations. Reasons for scrap or rework in production can easily be selected from a list, which is configurable per client. In the same way, you can qualify any machine stoppage by selecting reasons. The FORCAM FORCE™ Shop Floor Terminal runs through a browser-based environment, meaning you can use it on a Windows-based tablet as easily as on a Windows-based industrial terminal. Messages with workplace-specific evaluations can be directly accessed from the shop floor terminal, which can also be connected to any other web applications you choose. The layout and displayed information is fully configurable in each template. At the same time, you can configure individual steps in the reporting processes and the associated verifications for each terminal. There are different available templates that apply for different terminal configurations, which can be assigned to one or multiple workplaces.

Production data collection in the Shop Floor Terminal

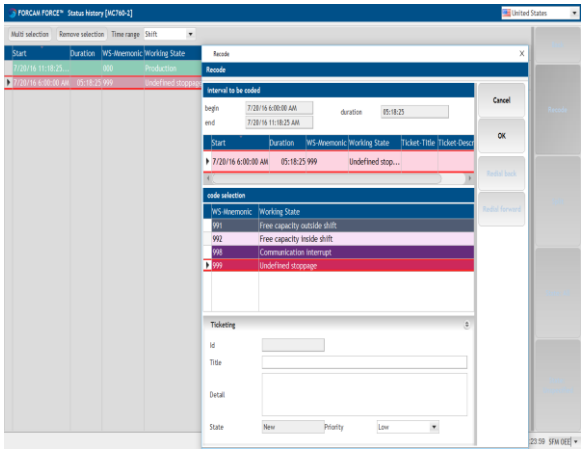


You can assign one or multiple workplaces to each terminal, selecting from within a table after logging in. All operations are displayed in another table for the given workplace. Deadlines, the material being manufactured, and the required rate are displayed in the table adjacent to the quantities that have already been manufactured. Underneath the list, further details on the work orders are displayed, which can be configured to each client's requirements. The toolbar lets you turn the operations on and off or lets you interrupt them. The order progress and the operating conditions can be viewed by the manufacturing staff in real time. You can also view the information assigned to each operation in the ERP system.



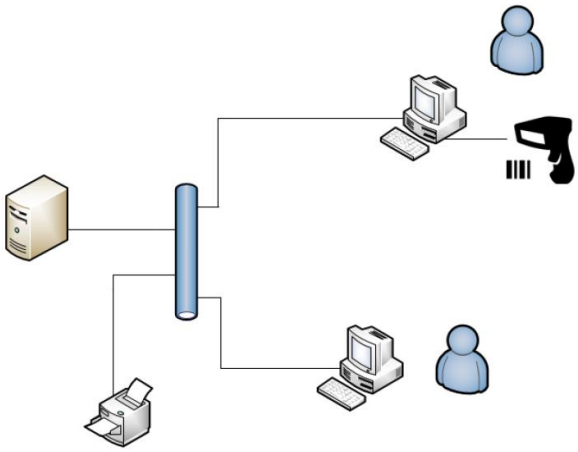
Through the Shop Floor Terminal, you can select whether automatically measured quantities should be categorized as material quantities, scrap quantities, or rework quantities along with a qualifying reason for each. The list of scrap and rework reasons can be tailored to a client's specific requirements.

Reason for stoppage



The status history displays the individual time intervals at which the workplace, facility, or machine held different operational statuses. The intervals can be split up and specified more precisely according to a list of stoppage reasons.

Terminal Server



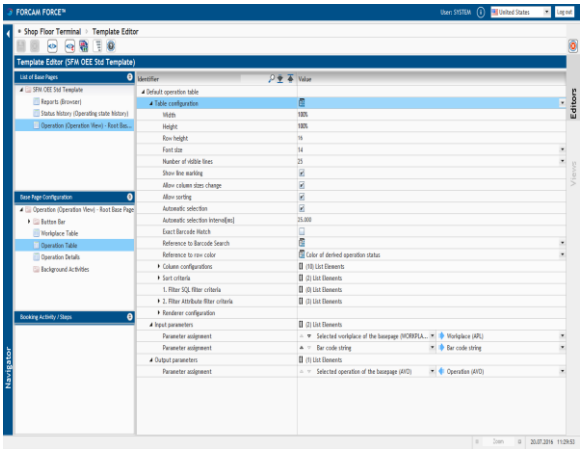
In a Terminal Server solution, applications are installed on a server and provided to the users. The user executes the application on a terminal. The terminal only serves as an input/output device and only mouse movements and keyboard entries are transferred to the server. Data is never leaving the network.
By using a terminal, it is possible to call data and launch applications device-independent. The number of terminals is not limited.

In the Terminal Server solution by FORCAM, multiple terminals (Remote Clients) are connected to the server via Ethernet. The clients can run all functions of the SFT (e.g. booking quantities, changing status etc.) and use a USB barcode scanner[1].
If a printer is connected to the server, you can start a print job via Client (Remote Printing).

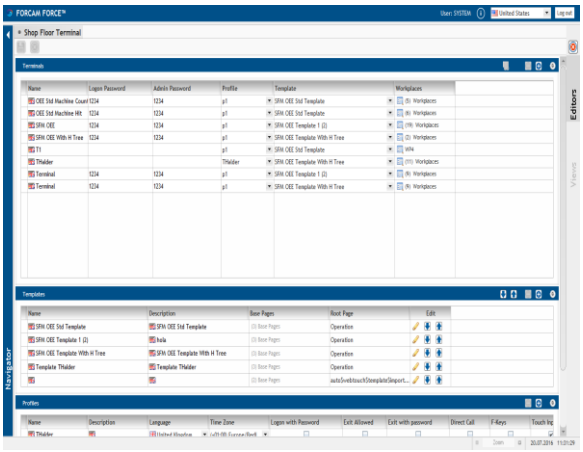
Client-specific configurability

In FORCAM FORCE™ Shop Floor Terminal, the layout of the interface, all report processes and verifications can be fully configured. You can also freely configure the way the production orders and processes transferred by the ERP system are displayed in the worklist. As you can integrate all modern web-based applications into the interface, the Shop Floor Terminal offers a central information point for the manufacturing staff on industrial terminals as well as mobile devices.

[1] See Test Protocol “Borg Warner Terminalserver Test”



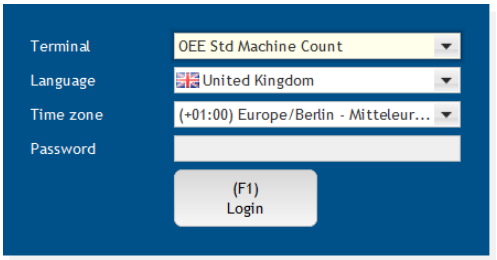
When configuring the terminal, you can add as many templates as you like. Alongside the template for operational data collection, others - to display FORCAM FORCE™ reports from the analysis module or to integrate web-based applications from third parties - are also possible. When configuring the template for operational data collection, you select which data to display in the workplace overview, the order overview on the worklist, and the order details view. You can also freely configure how many buttons are shown in the toolbar along with their function. Each individual button can be fully configured along with the associated report steps and verifications. Currently, there are 90 elementary, flexible, and adjustable report modules available to describe report steps, which will be expanded in future.



Different terminal configurations can be stored as templates, where one or multiple terminals can be assigned any number of workplaces. This lets you assign a report logic configuration to a group of similar workplaces, it raises the re-usability of a configuration, and saves the operator from having to assign a report logic to each workplace.

Terminal selection and logging in

In the Shop Floor Terminal browser interface, you first log in to a specific terminal, where a terminal may manage multiple workplaces.



When logging into the Shop Floor Terminal, you need to enter the terminal itself, the terminal language as well as the time zone, and - if necessary - a password.

Standard terminal template

The terminal template delivered as standard corresponds to the OEE standard and the OEE auto status template of the data collection system. The following messages are sent to the collection system depending on the operator's action and are then processed both via the OEE standard and the OEE auto status template:

Messages	Command	Function
Operation Phase	OperationPhaseCommand	Phase Messaging (set-up, production, ...)
Operation Quantity	OperationQuantityCommand	To manually book a qualified quantity (yield, scrap, rework quantity) including reasons
Machine Status	MachineStatusRevisionInsert Command	Stoppage reason/splitting a status interval

The messages sent from the Shop Floor Terminal of a workplace can be viewed in the "Message Log" report.

Operation Phase Messages

Time stamp	Message	Workplace	Order	Operation	Details (Status)
Jul 13, 2016 3:55:54 PM	Operation Phase	MC760-3	5040	0010	In Progress
Jul 13, 2016 3:50:30 PM	Operation Phase	MC760-1	5040	0010	partial processed
Jul 13, 2016 3:12:33 PM	Operation Phase	MC760-1	5040	0010	In Progress
Jul 13, 2016 3:11:26 PM	Operation Phase	MC760-1	5040	0010	Setting up
Jul 13, 2016 3:11:12 PM	Operation Phase	MC760-1	5039	0010	Finished
Jul 11, 2016 1:53:23 AM	Operation Phase	MH760-6	4050	0010	Finished

Operation Quantity Messages

Time stamp	Message	Workplace	Order	Operation	Details (Status)	Number	Yield Qty.	Scrap Qt	Rework Qty.
Jun 1, 2016 6:08:00 AM	Operation Quantity	MC760-8	5031	0010	Yield quantity standard	0	1	0	0
Jun 1, 2016 6:04:00 AM	Operation Quantity	MC760-8	5031	0010	Yield quantity standard	0	1	0	0
Jun 1, 2016 2:00:12 PM	Operation Quantity	MC760-8	5031	0010	Generic failure	0	0	2	0
Jun 1, 2016 1:56:12 PM	Operation Quantity	MC760-8	5031	0010	Generic failure	0	0	2	0
Jun 1, 2016 1:52:12 PM	Operation Quantity	MC760-8	5031	0010	Generic failure	0	0	2	0

Machine State Messages

Time stamp	Message	Workplace	Order	Operation	Details (Status)
Jun 1, 2016 6:00:03 PM	Machine State	MC760-8			
Jun 1, 2016 4:30:03 PM	Machine State	MC760-8			Undefined stoppage
Jun 1, 2016 3:25:02 PM	Machine State	MC760-8			Undefined stoppage
Jun 1, 2016 2:00:15 PM	Machine State	MC760-8			Undefined stoppage

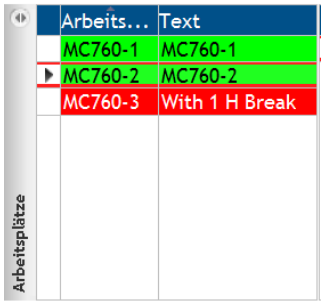
It is important to ensure a consistent system configuration so that the OEE templates for data collection and booking logic are able to process the messages transmitted by the Shop Floor Terminal.

Standard terminal template views

The terminal template that comes as standard has three views: the BDE view, the status history (to establish stoppage reasons), and reports (to display reports within the Shop Floor Terminal).

Order Data Management (BDE) view

The BDE view display is divided up as a table above with a details field below it. The toolbar is located to the right of the display, which adapts to the selected operation in the display area and lets the operator carry out different actions.



Workplace table

The BDE view exists in the upper half of two tables. The left table shows the workplaces assigned to the currently selected terminal. Depending on which workplace has been selected in the left table, the right table will show a list of operations that have been assigned to it.

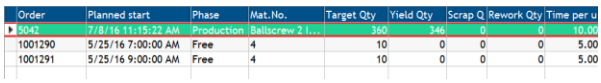


Table of operations

The table of operations consists of configurable columns - in the OEE template these show the order, the item number, the target quantity, actual quantity, cycle time, the planned start time of the given operation, as well as the phase description and the abbreviation indicating the operation status.
The details of whichever operation has been selected in the operation table are shown below both tables. These include (but are not limited to) the item number, the item text, the order and the operation, its scheduled start time, scheduled end time, set-up time, cycle, stroke factor, production time, the planned quantity, and remaining quantity. In addition to this, the operation status and the operational status of the workplace are displayed with a color illustration. A piece counter shows the quantity which has been reported by the machine but still needs to be qualified.

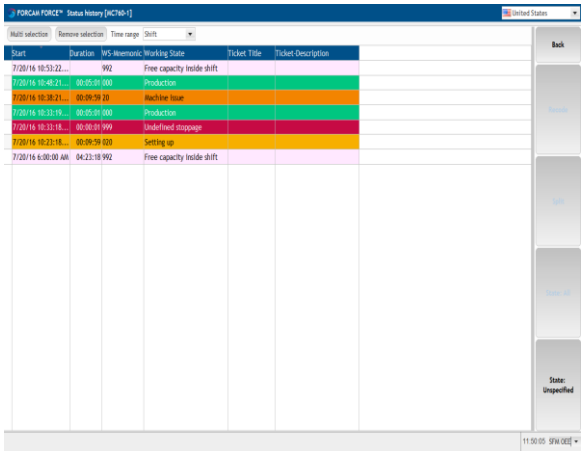
Operation details view

Toolbar in the Order Data Management view

The toolbar lets the operator execute different context-specific actions; these depend on the operation selected. The following toolbar buttons come as standard:

Main Group	Button	Function
Back	Back	Log out of the Shop Floor Terminal and return to log-in screen.
Set-up	Start set-up	Reports the start-up phase for the selected operation. Only a maximum of one operation can be reported per workplace in the set-up or production phases. If another operation is already active (set-up or production) the button is deactivated.
	End set-up	This message tells you the set-up phase for the selected operation has ended. If the selected operation is not in the set-up phase, the button is deactivated.
Production	Start production	This message signals the production phase for the selected operation. Only a maximum of one operation can be reported per workplace in the set-up or production phases. If another operation is already active (set-up or production) the button is deactivated.
	Quantities	Lets you qualify the automatically recorded quantities as yield, target quantity, or rework quantity and also lets you select the associated reason. For this, quantity reasons must be configured in the workbench. The button is only active during the 'production' status.
	Interrupt order	This lets you interrupt a current production operation. The button is only active during the 'production' status.
	End order	This lets you end a current production operation. The button is only active during the 'production' status.
Operation texts	Operation texts	Operation associated text displayed.
Disruption history	Stoppage history	Changes in the status history (stoppage history)
Reporting	Reporting	Changes in the reports display

Display in the status history



In status history, you can select to display the status of the last shift, the last two or three shifts, the last eight shifts, the last day, last three days, or of the last week. A table is shown listing all statuses within the selected time period, including the following details: Start, end, status reason, status description, and additional comments.

Operation details view

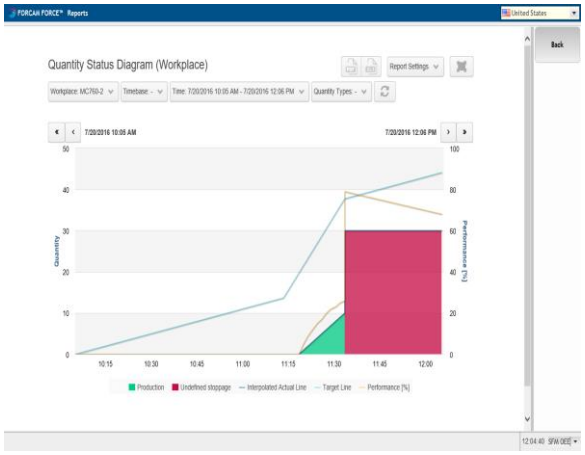
Buttons in Status History

The toolbar lets the operator execute different context-specific actions; they are dependent on the time period selected in the display window. The following toolbar buttons come as standard:

Button	Function
Back	Changes back to the BDE view
Transcoding	Confers a reason for stoppage or status change
Split	Lets you split time intervals, allowing you to assign two different statuses
Comments	Lets you record a comment in addition to the status reason
Status: All	Shows the whole status history of the selected time period
Status: Undefined	Shows only stoppages in the status history with no assigned reason

Use the Workbench to configure stoppage reasons, defining which statuses to change, split, or assign a comment to.

Displaying reports within the Shop Floor Terminal



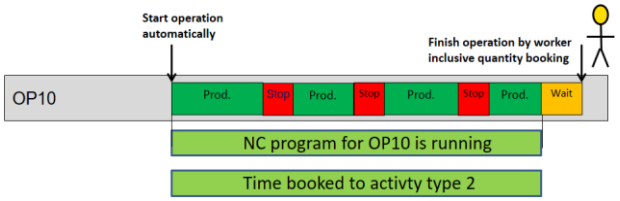
Quantity status diagram in terminal

Displaying reports

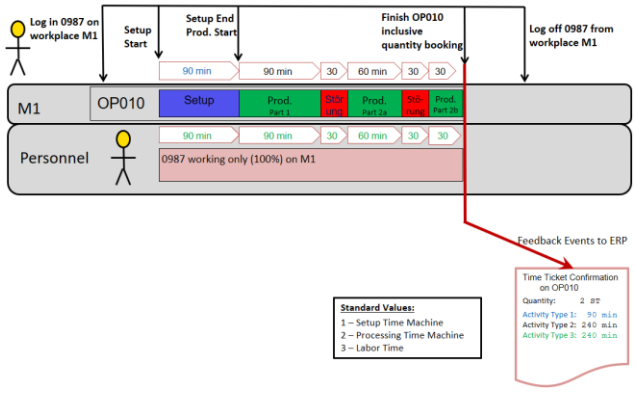
The terminal template is not configured to show a default report. Only once the corresponding URI is detected in the Workbench on the terminal configuration may reports be accessed and displayed within the Shop Floor Terminal. If the operator selects 'return', they will return to the Shop Floor Terminal's BDE view.

Special Messaging features

Automatic start of order for pallet machines



Automatic allocation of a running process to an operation from the operation list. No time-consuming, manual allocation of pallet sides to operations is necessary.
Requires machine control to save the currently running NC main program in a data block or to be made readable by the interface. It is necessary to define unambiguously in the operation where the associated NC program is located.
The operation starts automatically after detection of change of NC program. The quantity report is manual. Can be linked with the main time parallel set-up function.



Single-machine operation

Work time logging

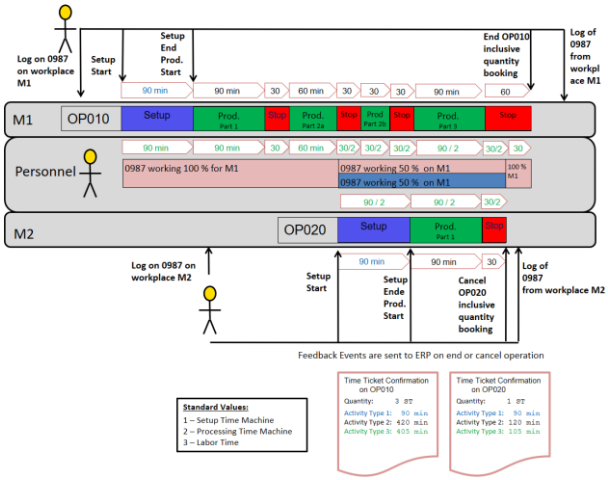
Work time is only determined based on the operation and the work time activity to determine the actual costs.

Operators log in and out at a terminal at the workplace. When logging in and out, it is possible to check against a HR mini master and the process is not permitted if data is

invalid. As soon as one or more operations are active, all logged-in operators are automatically logged in to the operations. When an operator logs out from a workplace, he or she is automatically logged out from all active operations.

The following safety functions may be used:

- If no one is logged in at a workplace and an operation start operation occurs, authentication is required. After successfully logging in, the operator is automatically logged in at the workplace and the operation start operation is executed.
- To secure the log-out process, a timeout value is maintained in the workplace template or directly in the workplace master data as local version. If the timeout value of a logged-in operator is reached, forced log-out takes place. Cancelation (status 89) for operations that are still active takes place for the last logged-in operator.
- If the last operator logs out of a workplace with active operation, a quantity dialog is displayed and the operation is interrupted (status 89)



Multiple-machine operation with linear time distribution

For multiple-machine operation (one operator logs in for multiple workplaces and operations), time distribution is linear for parallel operations.

Feature Specification

Functions

- Comprehensive data collection, as required for feedback to a higher-level ERP system
- All production orders and processes transferred by the ERP system are viewable in the work list
- Collection of additional manufacturing information for shop floor management
- The ability to create a detailed specification of operational statuses including reasons for stoppage
- Detailed report of reasons for scrap or rework
- The ability to link reports, visualizations as well as any third-party applications of your choice
- Operations started automatically depending on running NC program.
  - With and without main time parallel set-up.
  - Operations can be allocated to workplaces or workplace groups.
- Work time logging as operation-related logging of activity type as non-personalized duration
  - Logging in and out at workplace and all active operations
  - Multiple-machine operation with linear time distribution of parallel operations
  - Work time activity type is reported back to ERP as non-personalized total duration per operation
  - Safety functions: Forced logoff via definition of a timeout absolute value, quantity report and interruption of operation when last person at workplace logs off
- Remote access to a central Terminal Server from several computers, installing the application only once

Special Features

- The layout, messaging processes, and verifications can be configured to specific client needs
- A thin client option that is less processor-intensive
- Support for mobile devices running Internet Explorer 10
- You can link any web-based applications of your choice with the Shop Floor Terminal