

Fast, Flawless Filling Minimal Engineering Effort



Ready in Minutes

The integrated fill/dose application enables high accuracy filling of a wide range of container types and sizes to meet your unique requirements with minimal setup time. Use the web interface to easily configure your filling system so that you are up and running within minutes.



Flexible Configuration

Whether you require stand-alone filling with I/O control or full PLC integration, IND360 delivers ultra-fast results even when the PLC is busy with other tasks. Condition monitoring and Smart5™ alarms ensure continued high performance.



Simplified Integration

IND360 utilizes certified automation interfaces including driver files, function blocks and an AOP to reduce valuable engineering hours. With IND360's well-defined state machine, you easily achieve full logical control, and you are always informed via the automation network and HMI.



Continuous Accuracy

Ultra-fast processing speed and I/O control enable fast, accurate results. Built-in algorithms continuously optimize cut-off points and quickly adapt to changes in actuators, material characteristics and environment. Advanced electronic filtering eliminates inaccuracy due to vibration caused by your material handling system.



IND360fill/dose Indicators Repeatable, Ultra-Fast Filling

IND360fill/dose connects to your PLC in less than five minutes and streamlines your filling processes by providing accurate, repeatable results.

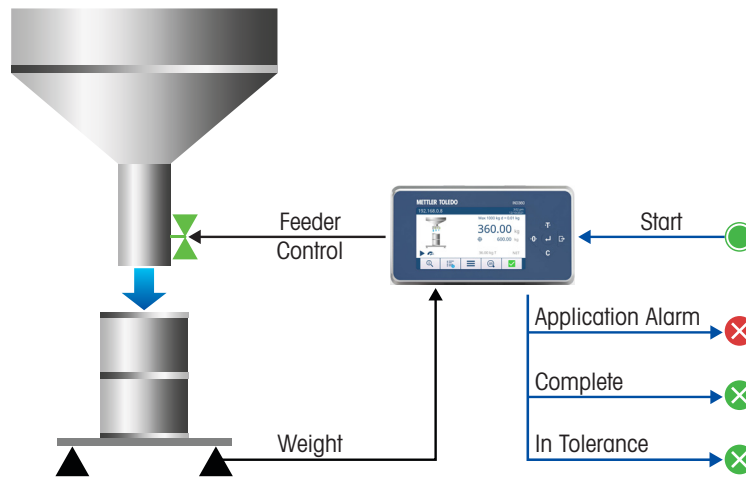
Features include:

- Automatic tare, tolerance check and jog functions
- Automatic optimization of spill and cut-off points
- Industry-leading vibration reduction
- Legal for Trade OIML R61 approved
- PROFINET, Profibus DP, EtherNet/IP, Modbus RTU/TCP, EtherCAT and digital I/O, Analog output (4-20mA / 0-10VDC)
- Supports analog, POWERCELL® and high precision (EMFR) scales

Filling Using IND360's Digital Input/Outputs System Configuration Options

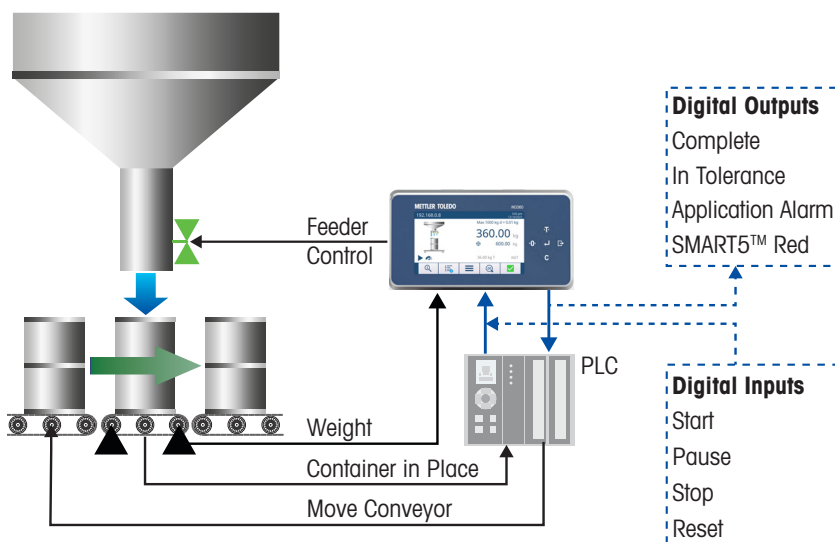
Leverage the web interface or the HMI for setup and control of your filling operation (weighing-in) through IND360's digital inputs and outputs. These configurations are ideal for semi-automatic applications with operators who trigger the filling procedure or for basic PLC/DCS connectivity.

Example 1: Operator-Initiated Filling (Digital I/O)



Operator presses the start button to execute the filling operation; then IND360 autonomously controls the filling process. This is ideal for entry-level systems that repeatedly fill identical quantities of material.

Example 2: PLC-Initiated Filling (Digital I/O)

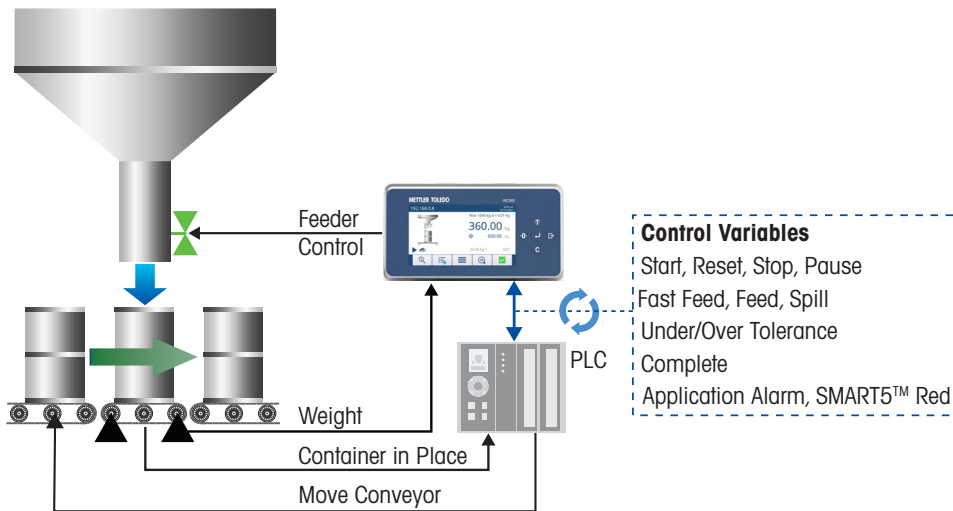


A filling operation started by a PLC through an IND360 input. IND360 handles the time-critical filling operation and reports status through output signals, while the PLC manages higher-level functions such as placing the next container. Using this complementary control method allows you to choose a lower-priced PLC to reduce your machine cost.

Filling Using IND360's Automation Network System Configuration Options

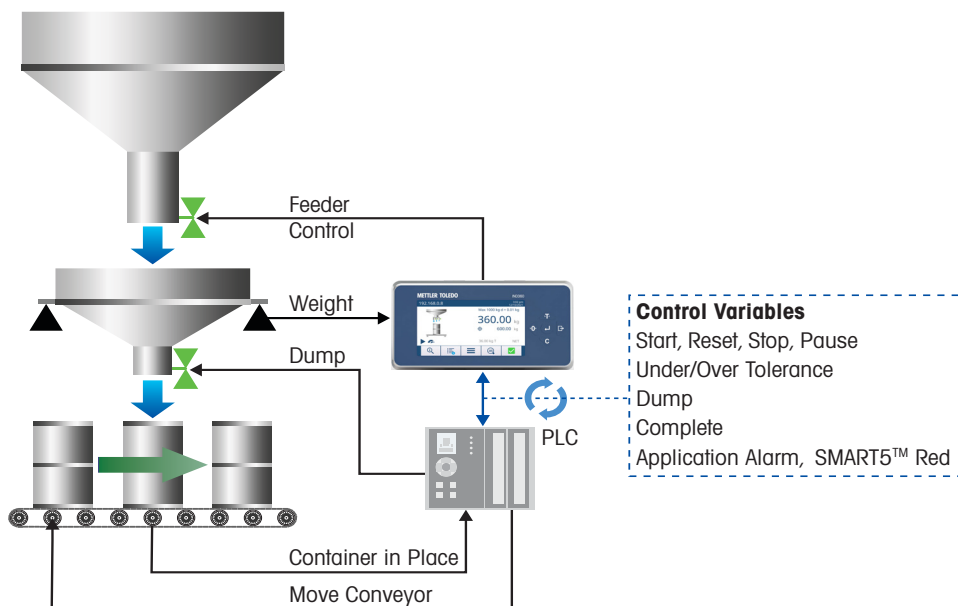
IND360 is the optimal fit for your automation environment because it allows the PLC/DCS to control all functions via the automation network. The time-critical filling operation is handled by IND360, allowing you to reduce cost, complexity and performance requirements on your PLC/DCS.

Example 3: Decentralized Filling (Automation Network)



The control system initiates the filling operation and manages other associated tasks like moving the next container into place. The digital outputs of IND360 directly control the actuators and handle the time-critical actions for common filling tasks, allowing the PLC/DCS to monitor all relevant parameters and manage the filling requirements of different products by sending new target values to IND360.

Example 4: Decentralized High Throughput Fill/Dump (Automation Network)



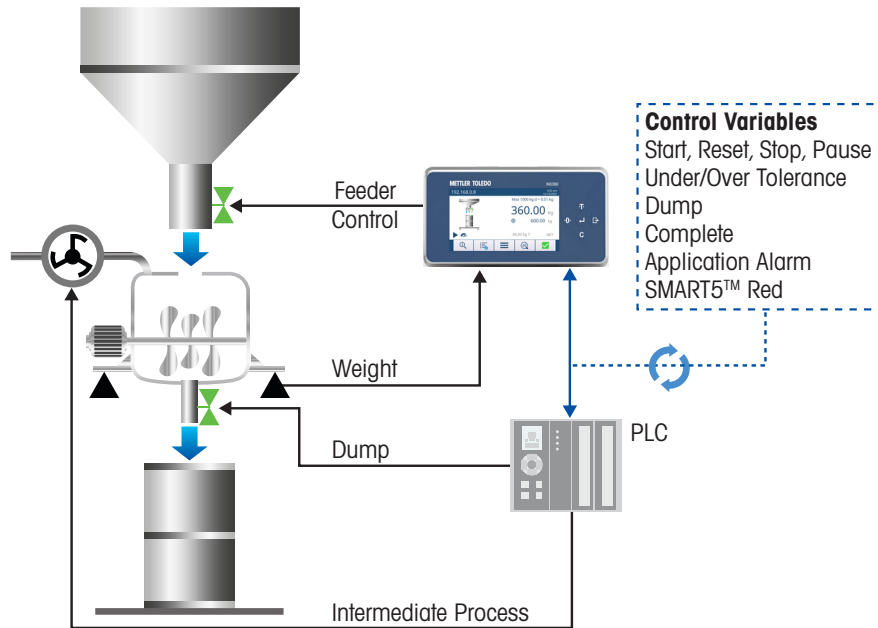
System operation works the same as in Example 3, except the system fills the buffer container with the desired amount of material and executes a consecutive dump operation to dispense all material into the target container. The advantage compared to Example 3 is the increased speed, as you can fill the buffer container while positioning the target container.

Advanced Filling Workflows with Decentralized Control

System Configuration Options

By routing the readily available filling status information through the PLC, you can combine the strengths of both the PLC and IND360. The PLC integrates other sensors and actuators, and IND360 executes the filling operation with high accuracy following its well-defined machine states.

Example 5: Fill/Dump with Intermediate Process

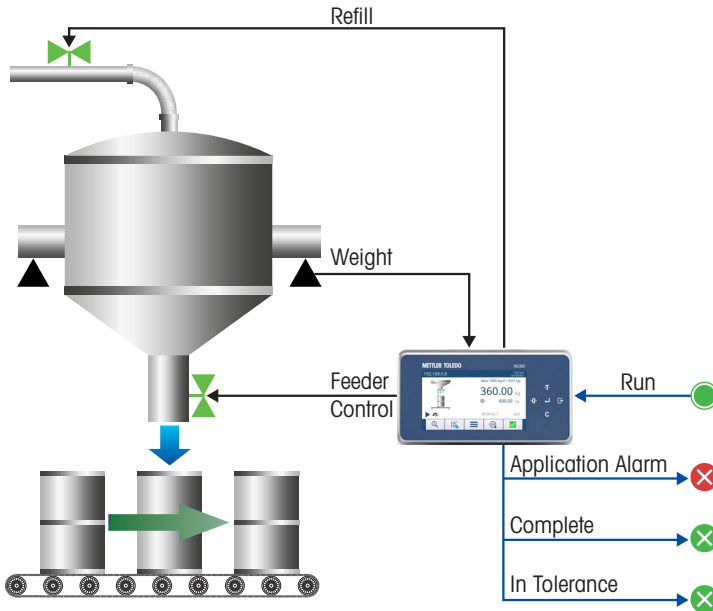


IND360 fills a buffer container with the desired amount of material and then signals the PLC that this step is complete. The PLC executes the intermediate process and triggers the dump operation. Once the weight falls below the configured threshold, IND360 signals the PLC that the buffer container is empty. This example configuration demonstrates a close collaboration between IND360 and the PLC to realize this advanced workflow.

Dosing Using IND360's I/O and Automation Network System Configuration Options

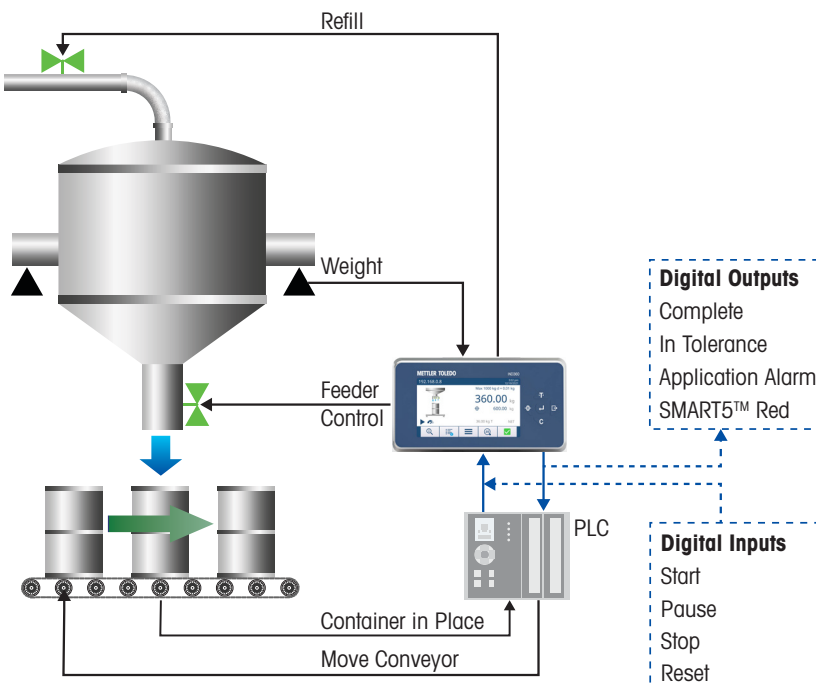
Controlling your dosing operation (weighing-out) through IND360 is as easy and effective as the filling applications previously described with very similar configuration options. Connectivity through digital I/O or the automation network are both possible.

Example 6: Operator Initiated Dosing (Digital I/O)



Operator presses the start button attached to the digital input to execute the dosing operation, and IND360 autonomously controls this dispensing process. This is ideal for entry-level systems repeatedly dosing the same amount of material without the need for extensive operator interaction.

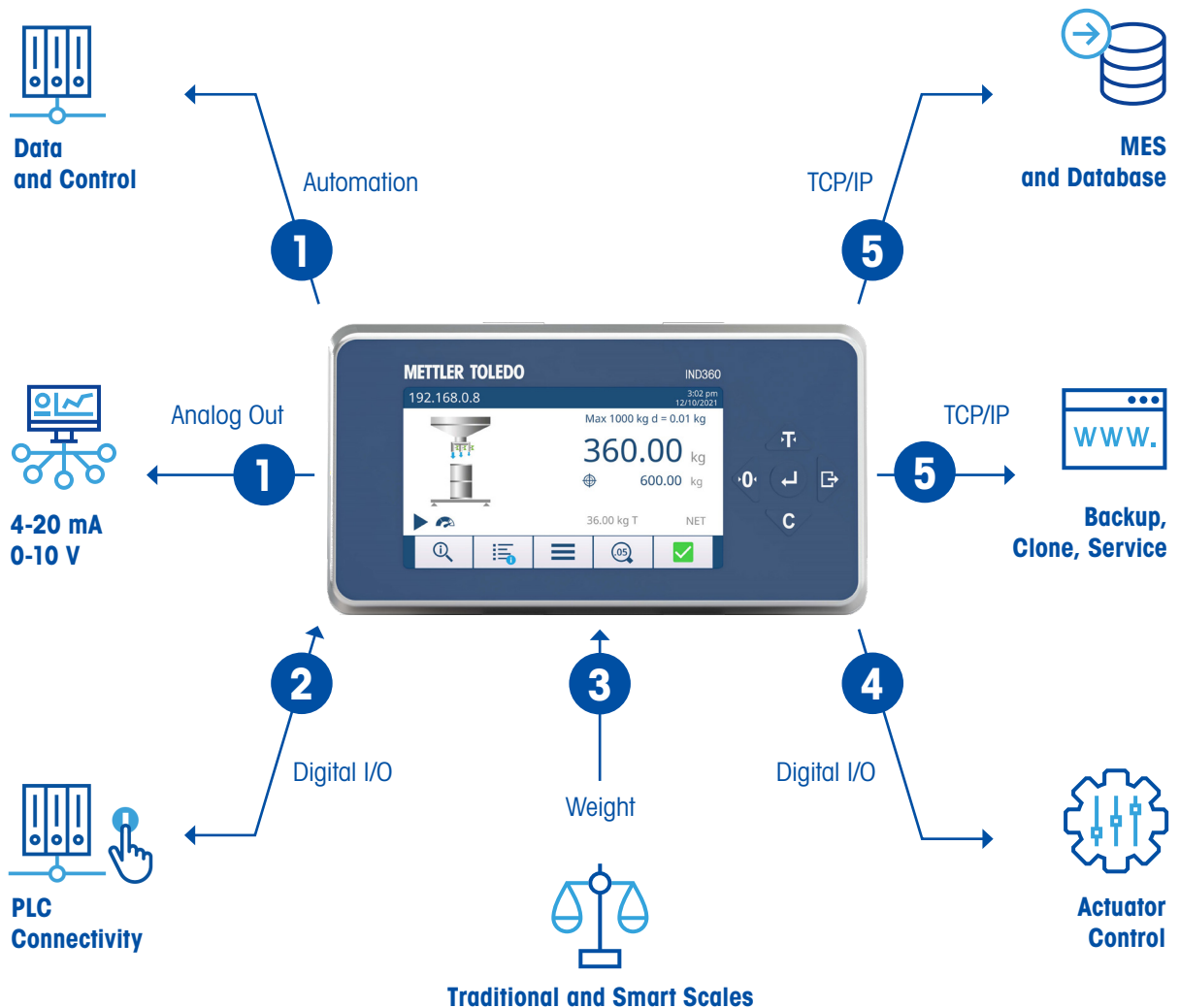
Example 7: Decentralized Dosing (Automation Network)



The control system initiates the dosing operation and manages other associated tasks. The digital outputs of IND360 directly control the actuators and handle the time-critical dosing operation.

IND360fill/dose Connectivity

IND360 offers you a broad set of connectivity options for seamless integration into your PLC or PC-based system.



1 Leverage the automation network to drive the filling operation, fetch status information and read live weight readings. The weight information is also available on 4-20 mA or 0-10 V.

2 As an alternative to the automation network, drive the filling process through IND360's digital inputs and outputs.

3 IND360 connects to both smart and analog sensors and scales to support a weighing range from 11g to 1,000t.

4 The digital I/O connects directly to the actuators, such as valves or pumps, for low latency and precise cut-off point control.

5 The service port provides an Ethernet TCP/IP connection to IT systems and acts as web interface for monitoring, configuration, backup, restore and many other unique functions.

Powerful Control Variables on your PLC

IND360 offers more than 250 control variables through its automation interface that give you the power to control, monitor, and maximize the performance of your filling or dosing system. Below is a subset of readily available data points. For the full set of data points, please refer to IND360fill/dose application manual and the IND360 PLC programming manual.

| | Category | Data Point |
|-----------------------------------|------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| State Machine | Control commands | Start, Pause, Reset, Stop |
| | Machine Status | Run, Complete |
| | Error Handling | Application alarm bits (Start weight invalid, auto tare fault, various timeouts, parameter invalid) SMART5™ Red, SMART5™ Orange |
| Filling Status Information | Feeding Status | Fast Feed, Feed, Spill |
| | Filling Result | In Tolerance, Over Tolerance, Under Tolerance |
| | Advanced | Jog, Refill, Dump |
| Weight Readings | Live Weight | Net Delivered (amount filled), Current Weight (gross, net, tare) All simultaneously available through cyclic IO image |
| Application Configuration | Basic Settings | Work Mode (Fill, Dose, Fill/Dump, Refill/Dose) Feed Speeds (One Speed, Two Speed) Output Type (Concurrent, Independent) |
| | Target | Filling target, pre-set tare |
| | Tolerances | Lower Tolerance, Upper Tolerance |
| | Cut-off points | Feed, Spill |
| | Automatic Tare | Operating Mode, Safety limits |
| | Jog | Operating Mode, Pulse Duration, Pause Duration, Max. Pulses |
| | Automatic Optimization | Spill optimization (operating mode and settings) Cut-off optimization (operating mode and settings) |
| | Advanced | Inhibit Time Various process and safety timeouts |
| Digital I/O | Input Assignment | Assign function to each digital input |
| | Output Assignment | Assign function to each digital output |

Further Information

For more details on the advantages and unique capabilities of IND360 and the fill/dose application, as well as manuals, drawings, PLC sample code and more, please refer to the following resources:



IND360fill/dose Introduction Video:

▶ <http://y2u.be/lpglvKErDmA>



IND360fill/dose Application Manual:

▶ www.mt.com/ind-ind360-downloads



IND360base Datasheet:

▶ www.mt.com/ind-ind360-downloads



PLC Connectivity Introduction Video:

▶ <http://y2u.be/KkjLIZHIpSM>



IND360fill/dose

Technical Features

For full device specifications, approvals and additional drawings, please refer to the IND360base datasheet.

| | Parameter | Description |
|-------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Application | Operating modes | Weigh-in (Fill, Fill/Dump), Weigh-out (Dose, Refill/Dose) Semi-automatic with I/O or fully integrated into PLC/DCS |
| | Feed speeds | Precise cut-off control for maximum throughput and accuracy One-speed feed and two-speed feed; concurrent or independent |
| | State machine | Derived from ISA-88 and PackML industry standards States: Idle, Run, Complete, Pause, Error Control commands: Start, Stop, Pause, Reset (control by automation network or I/O) |
| | Basic filling functionality | Automatic tare, tolerance check with timeout, cut-off overshoot control (inhibit time), dump control (time or residual weight), automatic refill for dosing (lower and upper limits) |
| | Jog | Automatic, single pulse, manual |
| | Safety functions | Automatic tare weight limits, Initial Feed Timeout, Process Timeout, Refill Timeout, Dump Timeout |
| | Automatic optimization | Continuous spill optimization with smart environment characterization Continuous cut-off point optimization |
| | Legal for Trade Approval | OIML R 61 (MID, 2014/32/EU) OIML R 76 (2006), EN45501:2015, WELMEC 2.1 Issue 4 |
| | Alibi memory | Up to 27,000 entries, access through web interface (.csv) or automation interface |
| Measuring | Supported scale types | Analog (480Hz), POWERCELL® (4 cells at 100 Hz), single-range Precision (up to 92 Hz) |
| | Digital filtering | Scale type dependent, removes mechanical and environmental noise, adjustable via PLC/DCS |
| PLC connectivity | Industrial Ethernet | PROFINET, EtherNet/IP, Profibus DP, EtherCAT, CCLink IE Field Basic, Modbus RTU, Modbus TCP |
| | Certification | PNO (Siemens), ODVA (Rockwell and others), ETG (EtherCAT), CLPA (CC-Link IE Field Basic) |
| | Data exchange | Cyclic: 480 Hz bidirectional read/write data exchange via process image 16 bytes, or 64 bytes Acyclic: dynamic data size |
| | Condition monitoring | Heartbeat 1Hz, Smart5™ alarms (NAMUR NE107), Individual POWERCELL® alarms, overload, underload, temperature, sensor network failure, etc. |
| | Selectable data | Up to 7 high-speed weight values (32-bit float), binary status for condition monitoring Device and application configuration, including set points (read/write) Device and application status information (read) |
| | Device description files | GSD and GSDML (for Profibus DP and PROFINET) EDS (for EtherNet/IP), Rockwell AOP integrated into Studio 5000 ESI (for EtherCAT) CSP+ (for CC-Link IE Field Basic) |
| | Command set | METTLER TOLEDO Standard Automation Interface for filling and dosing applications |
| | Sample code | Fully functional sample project for: Siemens TIA Portal (≥ V14 SP1) Rockwell Studio 5000 (≥ V24) |
| | 4 – 20 mA or 0 – 10 VDC weight output | For Gross, Net, or Absolute Value 16-bit resolution |
| Digital I/O | Input signals | Up to 5 configurable inputs. Functionality: Start, Pause, Stop, Reset, Tare, Zero, Clear tare, Jog, Jog complete (manual jog) |
| | Output signals | Up to 8 configurable outputs. Functionality: Fast feed, Feed, Spill, Dump, Refill In tolerance, over +tol, under –tol Run, Pause, Complete, Jog, Application alarm, Smart5™ red, SMART5™ orange Over capacity, Center of zero, under zero, motion, net |
| | Voltage | Logical high voltage: 5... 30 VDC Logical low voltage: 0... 3 VDC |

Explore Our Service Solutions

Tailored to Fit Your Equipment Needs

METTLER TOLEDO Service delivers resources to enhance your efficiency, performance, and productivity by providing service packages that fit your operational needs, maximize your equipment lifetime, and protect your investment.

► www.mt.com/IND-Service



Start with professional installation

Installation services include support for your unique production situation:

- Professional IQ/OQ/PQ/MQ documentation
- Initial calibration and confirmation of fit-for-purpose
- Hazardous area installations



Extend your warranty coverage

Add two years of preventive maintenance and repair coverage to protect your equipment purchase and achieve maximum productivity and budget control.



Calibrate for quality and compliance

The professional Accuracy Calibration Certificate (ACC) determines measurement uncertainty in use over the entire weighing range. Corresponding annexes give a clear pass/fail statement for specific tolerances applied, such as fit-for-purpose (GWP®), OIML R76, NTEP HB44, or further regulations.



Schedule maintenance

Full preventative maintenance plans offer inspection, functional testing, and proactive replacement of worn parts.

Health inspections offer a full assessment of current equipment condition with professional maintenance recommendations.



Maintain accuracy over time

Receive professional guidance (GWP® Verification™), including a routine testing plan that specifies four key factors to maximize your efficiency and ensure quality:

- Tests to perform
- Weights to use
- Testing frequency
- Tolerances to apply

METTLER TOLEDO Service

Our extensive service network is among the best in the world and ensures maximum availability and service life of your product.

METTLER TOLEDO Group

Industrial Division

Local contact: www.mt.com/contacts

Subject to technical changes

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MarCom Industrial

www.mt.com/IND360-apps

For more information

