qSCALE Ix RCI

A Simple Solution for Telescopic Cranes

qSCALE Ix – System for Rated Capacity Indication

↗ ## Efficient Calibration and High Accuracy

↗ An innovative RCI solution

- A flexible and effective rated capacity indication solution for telescopic cranes
- HMI visualization and rated capacity indication integrated in one device
- No programming needed: simply configure it
- Integrated datalogger
- Minimal system maintenance costs and repairs thanks to high-quality, reliable components
- Supports direct and indirect load measurement
- Measurement of boom length, boom angle and cylinder pressures

↗ qSCALE Ix Concept

Software

System Configuration
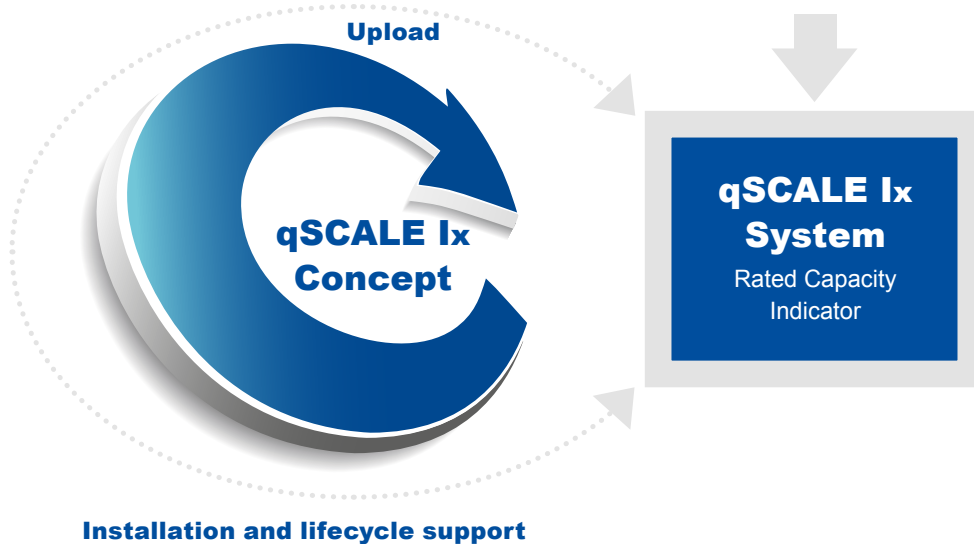
- Load Charts
- Geometric Data
- Operating Mode

Hardware

System Definition

- qSCALE Ix Console
- Sensors (also wireless)
- I/O Module

Upload

qSCALE Ix Concept

Configuration Tool

Service Calibration

qSCALE Ix System

Rated Capacity Indicator

Installation and lifecycle support

↗ qSCALE Ix System Overview

qSCALE Ix	+	Components	=	System Solution
Hardware		**Sensors**		

Console with integrated controller

Software

RCI

Visualization

Real-Time Core

iSENS HES

gSENS WGX

gSENS LWG (2x)

pSENS DAVC

fSENS KMD

wireless sensors

I/O Module

cSCALE DIO

qSCALE Ix

qSCALE Ix

↗ Functions

1

1 Operating Modes

- Main boom
- Fixed jibs
- Rooster sheave/runner

2 Capacity

- Nearly unlimited numbers of capacities in charts
- Number of charts only limited by storage capacity

2

3

$$M = (W_E \ell_E + W_N \ell)\cos\varphi + E(W_E \ell_E + W_N \ell)\cos\varphi \sin\varphi)$$

$$M = (W_E \ell_E + W_N \ell)\cos\varphi + \frac{E}{2}(W_E \ell_E + W_N \ell)^2 \sin 2\varphi$$

Angle

Pressure

Load

$$(W_E \ell_E + W_N \ell)\cos(\varphi + \Delta\varphi) = M$$

$$(W_E \ell_E + W_N \ell)\cos(\varphi + \Delta\varphi) = -\frac{1}{E}\Delta\varphi'$$

3 Main Boom

- Up to 8 telescopes
- Telescoping modes
  - Synchronous
  - Asynchronos
- Stowed jib

4

4 Carrier

- Inclination sensor
- Slew sensor to detect slew angle
  and switch load charts
- Working area definition

$$M = (W_E \ell_E + W_N \ell)(\cos\varphi \cos\Delta\varphi - \sin\varphi \sin\Delta\varphi) = (W_E \ell_E + W_N \ell)(\cos\varphi - $$

Length
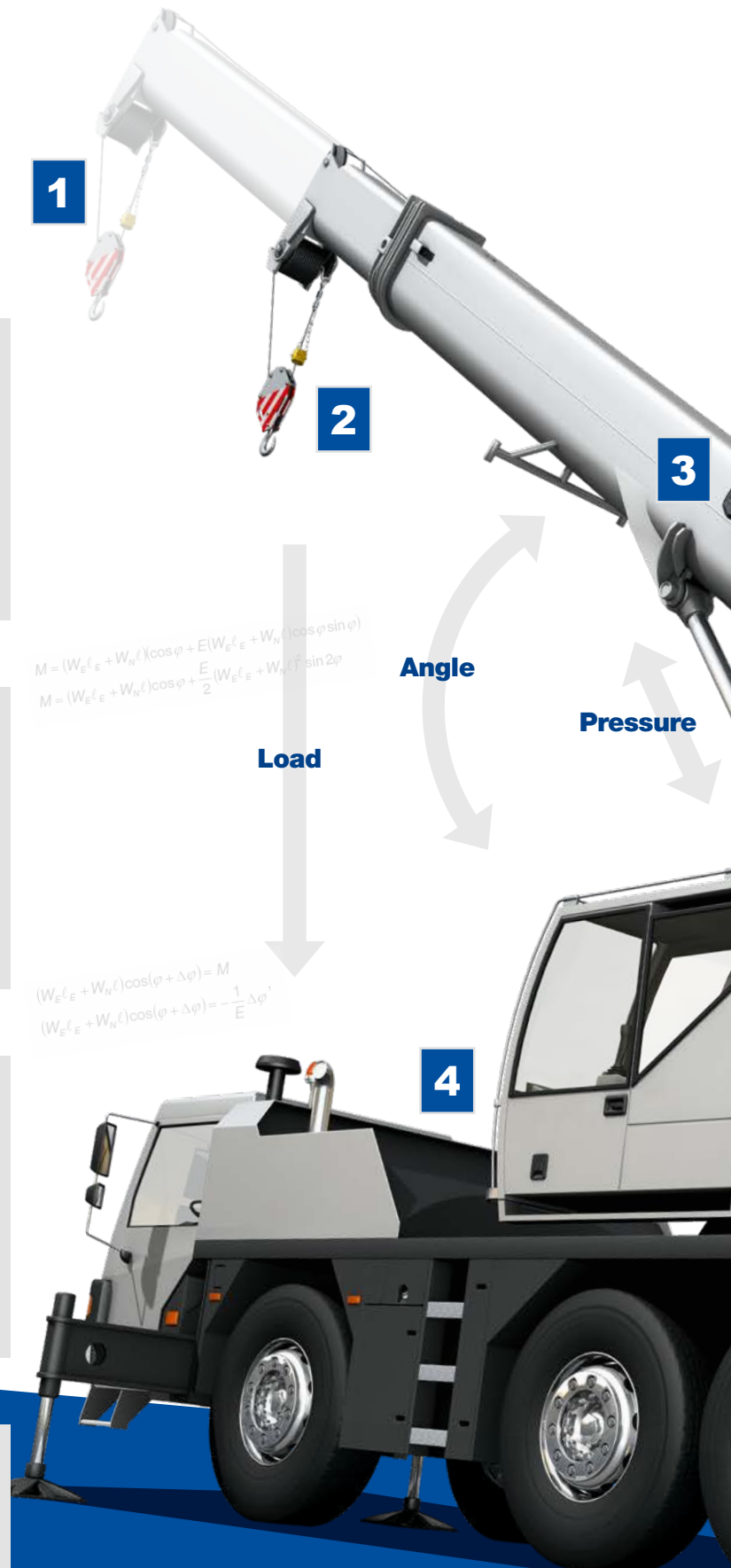
5   Load measurement

- Standard: pressure rod side and piston side
- Optional: direct load measurement with load pins or force transducers
- Compensation of cylinder friction

$$\Delta\varphi = -E(W_E \ell_E + W_N \ell)(\cos\varphi - \Delta\varphi \sin\varphi)$$

5

6   Hoist

- Main hoist and auxiliary hoist
- Monitoring maximum rope capacity
- A2B monitoring
- 3rd wrap monitoring

6

7   Outriggers

- Position monitoring
- Pressure monitoring
- Assignable to operating modes

$$\Delta\varphi = -\frac{E(W_E \ell_E + W_N \ell)\cos\varphi}{1 - E(W_E \ell_E + W_N \ell)\sin\varphi} \approx -E(W_E \ell_E + W_N \ell)\cos\varphi$$

**7**

WIKA

Configuration Tool

↗ General

- Windows based menu-driven configuration tool
- Display size (qSCALE I2: 4,3"/qSCALE I3: 7") and orientation (horizontal/vertical)
- Metric and domestic units
- Customized start screen e.g. customer logo during start-up of the device

↗ Crane Parts and Crane Geometry

- Configuration of crane geometry for booms, telescopes and jibs
- Graphic assistant for geometry input
- Definiton of telescoping sequence (synchronous/asynchronous)
- Outrigger definition
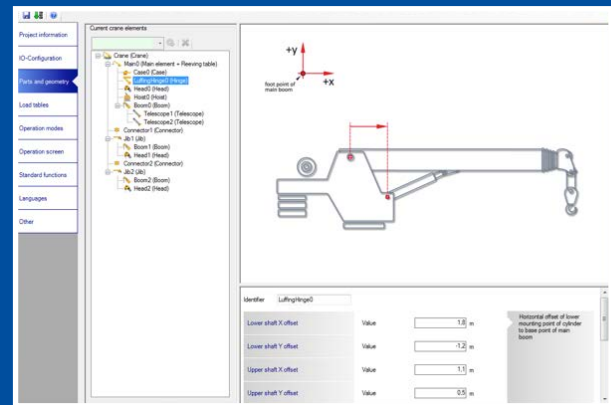
↗ I/O Configuration

- Configuration of Inputs and Outputs
- Drag and drop of sensors out of integrated sensor library
- Drag and drop of actuators out of integrated actuator library
- Export of customized wiring information
- Support of any 4...20 mA sensors
- Support of WIKA CAN sensors
- Mixed sensor device systems supported (4...20 mA/CAN)
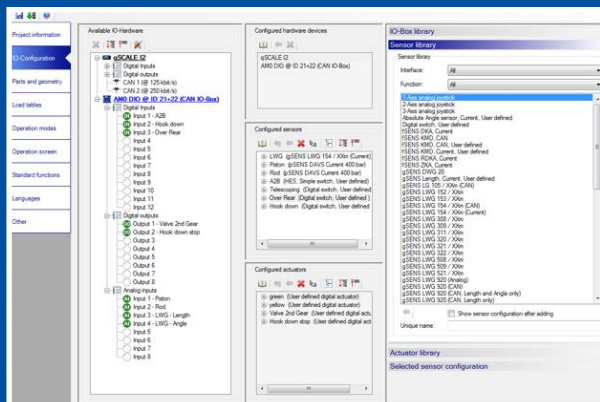

↗ Load Tables

- Copy and paste of customer capacity charts
- Multi dimension load tables supported
- Three-dimensional graphic view of load tables
- Configuration of crane behaviour in- /outside load chart

↗ Operation Modes

- Definition of the operating mode selection
- Option 1: full graphic operating mode selection
- Option 2: text list operating mode selection
- Option 3: combined operating mode selection by text and icons
- Assignment of load charts to operating modes
- Load charts switchable by slew angle, digital inputs or other conditions
- Graphics selectable from integrated image pool
- Import of customized graphics

↗ Operation Screens

- Definition of up to 3 operation screens/WYSIWYG
- Import of crane picture from the image pool
- Import of any customized crane picture in PGN format
- Free definition of display values
- Scaling size and position of display values
- User limits for angle/radius/slew angle/height
- Tare functionality
- Day/night switch
- Free configurable display switches
- Display of joystick state
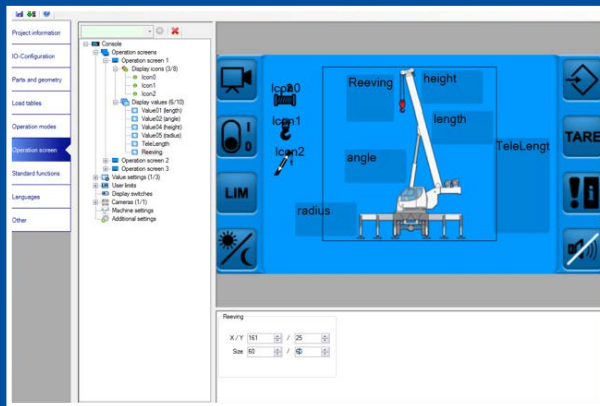
↗ Standard Functions

- Configurable warnings and cut-offs
- 3rd wrap detection
- Engine stopped
- Cancel horn
- Bypasses
- Set-up button
- Configurable audible and visual alarms
- Single movement cut-offs supported
- Password settings for admin and setup

↗ Languages

- Selection of languages for service screens
- 14 languages included
- Import and export of language files

Service

↗ Calibration

- Guided calibration
- Online connection to Device
- Highest accuracy can be achieved by verification steps
- Automatic logging of the complete calibration process
- Offline analysis of calibration data
- Overview chart of achieved RCL accuracy
  for release processes
- Visual display of accuracy by traffic light colours
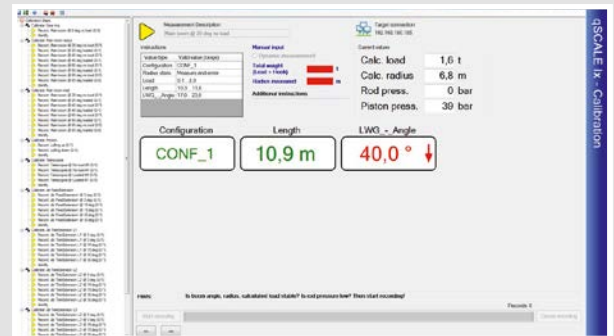
↗ Project Lifecycle

- Create Backup USB Stick
- Create Firmware USB Stick
- Import Project from Device
- Device Information
- Connection to Device
- Backup from Device
- Update to Device

↗ Service Updates

- Update and version management
- Automatic Online Checking for Updates

qSCALE Ix Device

↗ Hardware

- qSCALE I2
  - TFT Color Graphic LCD with LED backlight
  - Size 4.3", 95 mm (W) x 53 mm (H)
  - Resolution 480 x 272 px, WQVGA, 15:9
  - Colours 24 bit/16.7 Mio colors
  - Brightness typ. 400 cd/m²
  - Contrast Ratio typ. 400:1

- qSCALE I3
  - TFT Color Graphic LCD with LED backlight
  - Size 7", 152 mm (W) x 91 mm (H)
  - Resolution 800 x 480 px, WVGA, 15:9
  - Colours 18 bit/262 K colors
  - Brightness typ. 400 cd/m²
  - Contrast Ratio typ. 500:1

- With integrated control and RCL
- IP66/67 protection class
- Real-time capable
- Function keys: 8 (qSCALE I2) / 12 (qSCALE I3)
- Encoder with 16 mechanical detents and push function
- Home/return/confirm button
- Front USB port
- Integrated buzzer
- Information LEDs

↗ Operation

- Up to 3 switchable main operation screens
- Displays all relevant RCL data
  (load, capacity, radius, height, length ...)
- Utilization of bar graph
- User limits for radius, angle, height, slew angle
- Operation mode selection
  - Option 1: full graphic operating mode selection
  - Option 2: text list operating mode selection
  - Option 3: combined operating mode selection by text and icons
- Tare function
- Graphic display of telescopic state
- Level meter for inclination
- Display of the outrigger positions
- Display of current joystick positions
- Day/night switch
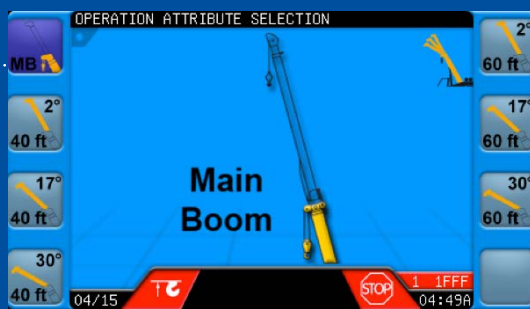
↗ Service and Diagnostics

- Entry of serial number
- Selection of display units (domestic/metric)
- Integrated CAN Bus diagnostics
- Error diagnostics
- Sensor diagnostics
- Guided sensor adjustment
- Manual sensor adjustment
- Setting of brightness/contrast/loudness
- Language selection
- Date and time setting
- Version Information Menu
- Update/Backup via USB
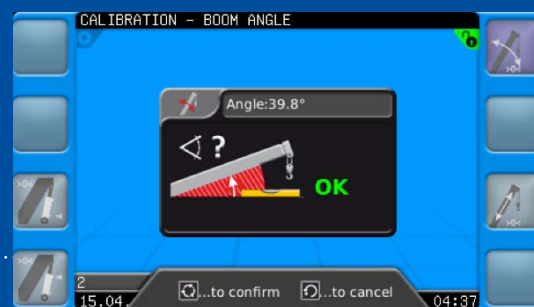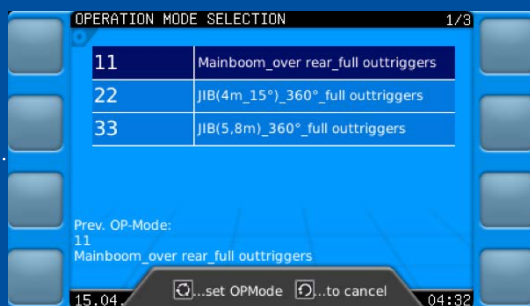
Datalogger

- Export of data via USB stick/alternatively via Eth/tool
- Free available data analysis tool
- Acceptance by MOM ministry of manpower Singapore
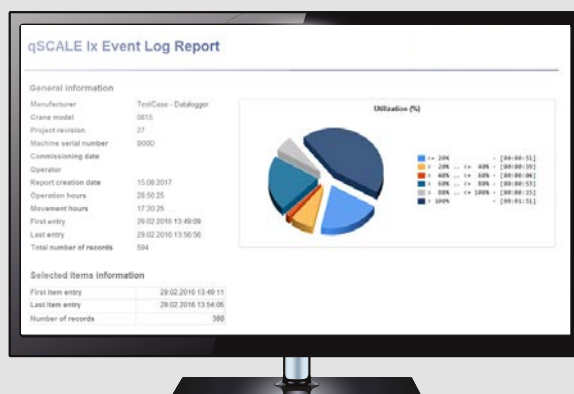- Acceptance by LTA land transportation authority Singapore

↗ General crane information

- Datalogger, Eventlogger, Lift recorder
- Errors
- Limit switches
- Bridging/bypasses
- Operation modes
- Logging of all RCI events

↗ Report

- Graphic evaluation of all data
- Export to PDF, Excel, Word
- Visual overview of crane operation during the whole datalogger period
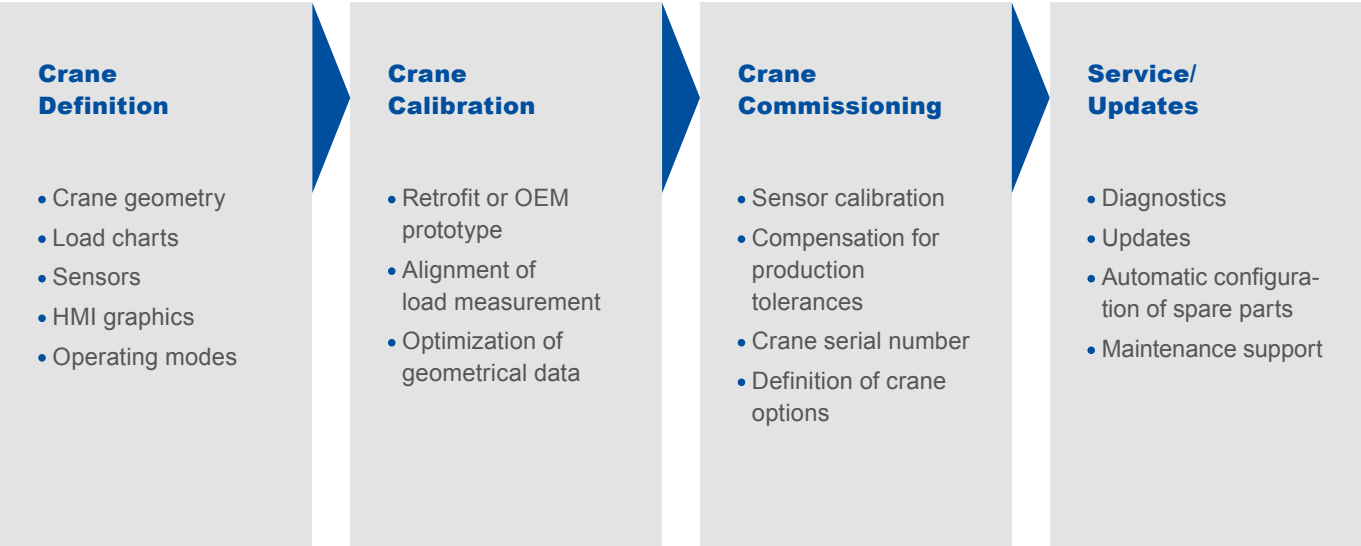

↗ Detailed data

- Errors
- Operating hours counter
- Lift counter
- Bypass/overload counter
- Graphic lift evaluation
- Real-time stamp
- Event logging

Lifecycle Support

The qSCALE Ix crane configuration tool supports the crane throughout its lifecycle.

Crane Definition

- Crane geometry
- Load charts
- Sensors
- HMI graphics
- Operating modes

Crane Calibration

- Retrofit or OEM prototype
- Alignment of load measurement
- Optimization of geometrical data

Crane Commissioning

- Sensor calibration
- Compensation for production tolerances
- Crane serial number
- Definition of crane options

Service/ Updates

- Diagnostics
- Updates
- Automatic configuration of spare parts
- Maintenance support

qSCALE Ix crane configurator license packages

Type of license	Service	Basic	Expert
Configuration			X
Service	X	X	X
Calibration		X	X
Order code	608805	608796	608797

Basic hardware components

Component	Order code
qSCALE I2	608732
qSCALE I3	608897
cable HMI	536848
cSCALE DIO DX-66-AM0	608785
cable cSCALE DIO	536849

Worldwide

We make lifting loads safer!

As an experienced specialist, we have spent many years providing reliable safety solutions for lifting loads, setting innovative standards in the process and ensuring dependable communication between machines and their operators, particularly in harsh environments.

By developing application software, mobile controllers and robust sensors, we ensure that our customers benefit from maximum safety and equipment uptime.

We are system integrators, supporting our customers through all project phases: from analysis and concept evaluation, through system design and project planning to prototype testing and field launches. Our safety experts support certification processes and are available for seamless life cycle management.

12/2018

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