



DEPRAG

Smart factory – Industry 4.0: In grinders?





■ Smart factory – Industry 4.0: In grinders?

State of the art

No information about:

- Working process
- Grinding speed
- Grinding efficiency
- Real working time
- Working habits
- Actual situation
- ...





Smart factory – Industry 4.0: In grinders? YES!

What if we change that?

Our new generation of the smart grinders is coming...

DEPRAG INDUSTRIAL INTELLIGENT TOOLS

DIQ





■ Our new intelligent grinder reaching smart factory



Built-in special module

- Autonomous system
- No external energy is needed
- Wireless communication
- Permanent monitoring of the tool



Angle grinder GAQ823-250BX



■ Our new intelligent grinder reaching smart factory



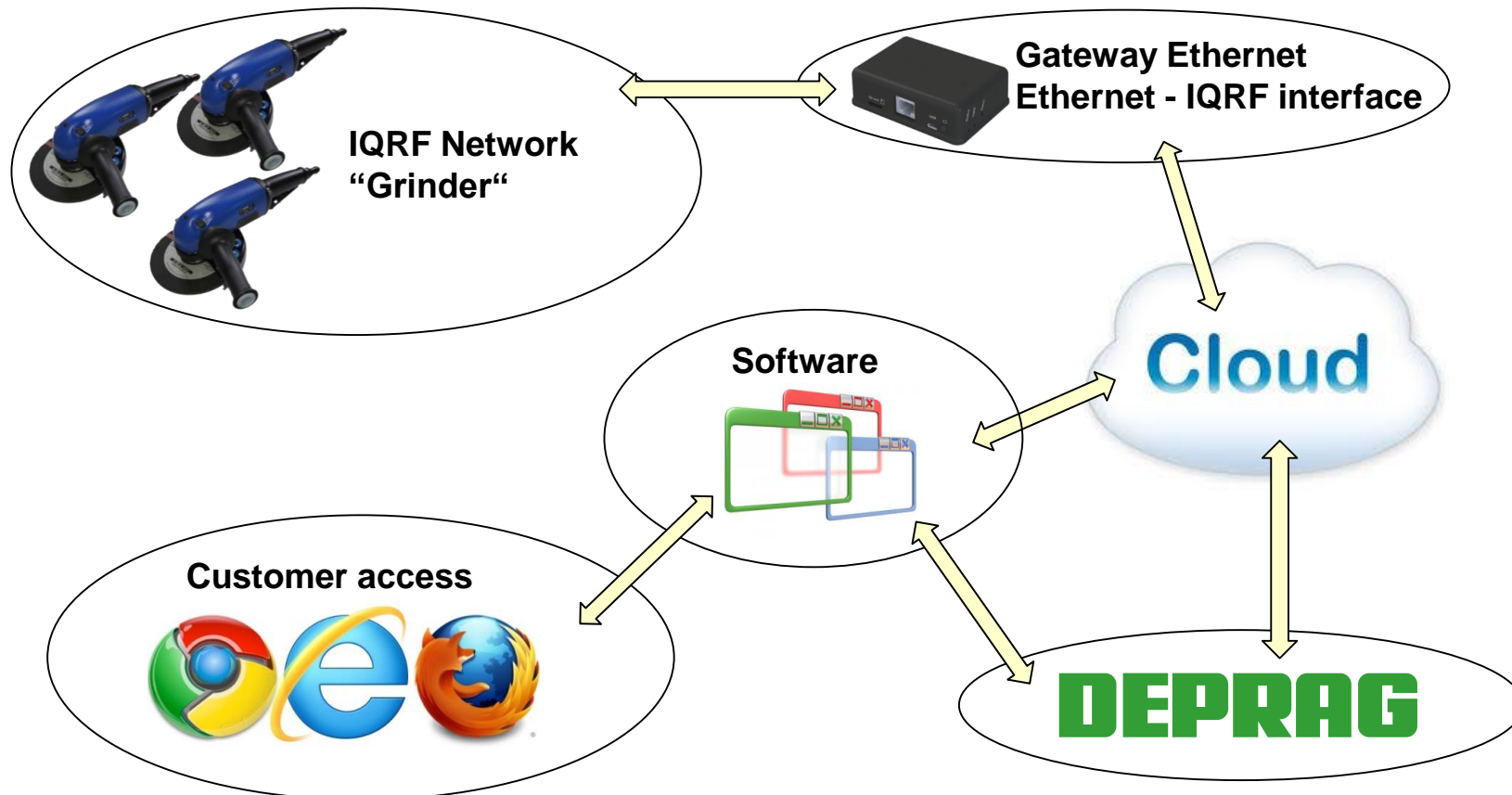
The special built-in module consists of:

- Power generator unit
- Lithium battery
- Internal memory
- Real time clock – RTC unit
- Internal evaluation CPU
- Special sensors to monitor the
- Working under special operatic
- Wireless communication: Free band 868 MHz, 916 MHz or 433 MHz
- RF range: 10+ m in buildings, 100+ m in open space





DIQ system – Basic principle communication





Screwdriving Technology

Automation

Air Motors

Air Tools

■ DIQ system – Basic operating modes



Working



- Continuous checking all parameters
- Evaluation the measured values
- Storing the important data

Communication

IQRF Network
„Grinder“



Ethernet GW



Cloud



- Communication with the GW
- Sending all stored data
- Receiving the new orders



Screwdriving Technology

Automation

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Air Tools

DIQ application and Industry 4.0 – Dashboard



[DASHBOARD](#)
[COMPANIES](#)
[DOWNLOAD](#)
[REPORTS](#)
[ACTUAL CONDITIONS](#)
[ALL TOOLS](#)
[KONFIGURACE](#)

COMPANY

display for company:

TIME FILTER

23.5.2016 00:00:01

29.5.2016 23:59:59

FILTER

hide "OK" lines

display "OK" lines

SHIFTS

01.06.2016

0:00 8 hod 1

CLOSE

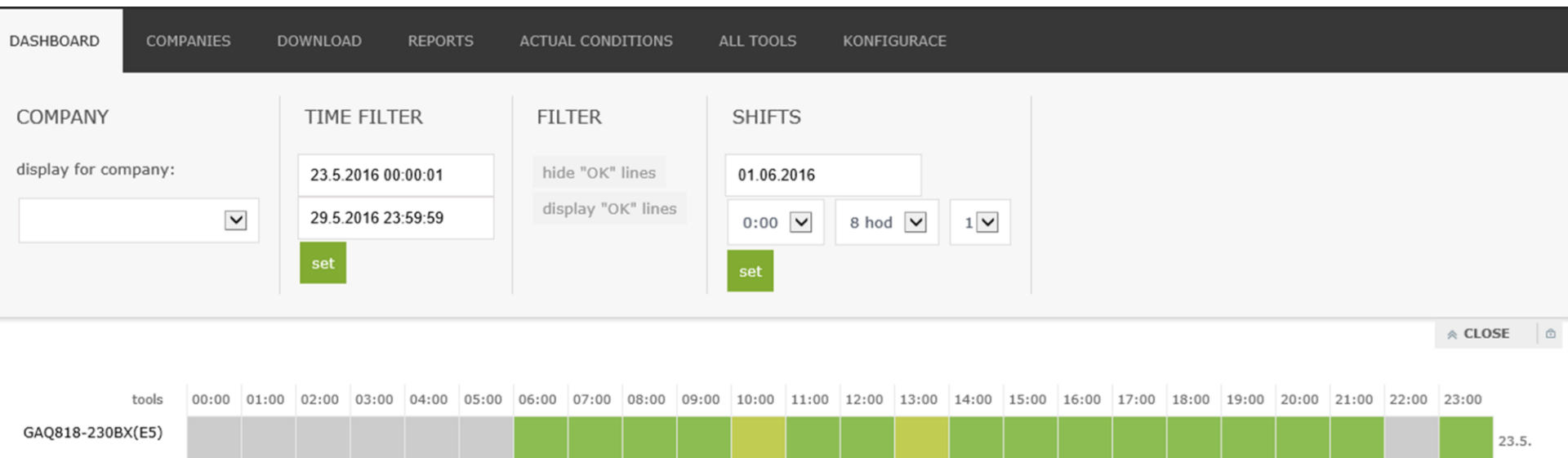
tools	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00		
GAQ818-230BX(E5)																										
																										23.5.
																										24.5.
																										25.5.
																										26.5.
																										27.5.
																										28.5.



DIQ application and Industry 4.0 – Dashboard



Fast overview on all tools and easy recognition OK or not OK statement.
Available information what to do...





Screwdriving Technology

Automation

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DIQ application and Industry 4.0 – Company structure



- Whole history
- Company hierarchy
- Tool recognizing
- Tool identification
- Online documentation

DASHBOARD COMPANY DOWNLOAD ACTUAL CONDITIONS CONFIGURATION

company > workers

EDITING SEARCH DISPLAY EXPORT IMPORT

add a new record show filter ▼ Default save view

XLS PDF CSV CSV

search search

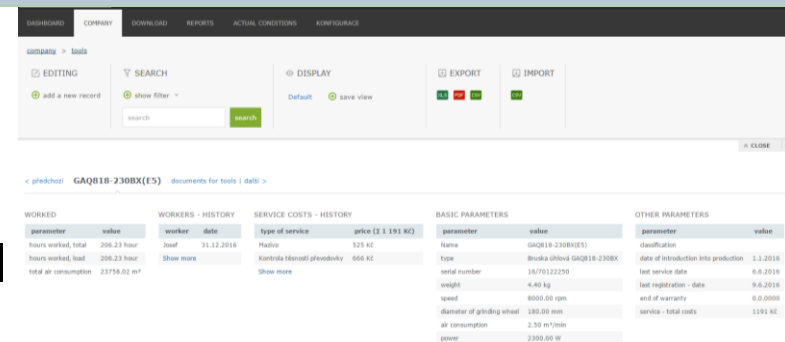
display all	1		Id	Jméno	Příjmení	Telefon	subordinates	classification	resp
1	⊗	☑	56	Antonín	Tichý	+420111222333	workers	departments	tools
2	⊗	☑	58	Jeronym	Boš	999 555 222	workers	departments	tools
3	⊗	☑	59	Miroslav	Otloukal		workers	departments	tools
4	⊗	☑	60	Radek	Vlažný		workers	departments	tools
5	⊗	☑	61	Tomáš	Rolenec	+777333111	workers	departments	tools
6	⊗	☑	65	Edita	Novotná		workers	departments	tools
7	⊗	☑	66	Petr	Šubr		workers	departments	tools
8	⊗	☑	67	Pavel	Šubr		workers	departments	tools
9	⊗	☑	68	Roman	Ptáček		workers	departments	tools
10	⊗	☑	69	František	Holeček		workers	departments	tools
11	⊗	☑	70	Václav	Spítek		workers	departments	tools
12	⊗	☑	71	Josef	Špaček		workers	departments	tools



DIQ application and Industry 4.0 – Tool card



- First launch of the tool
- Regular maintenance information
- History of the workers deals with the tool
- Total working time of the tool
- Total cost of the tool repairs
- Total used compressed air



WORKED		WORKERS - HISTORY		SERVICE COSTS - HISTORY		BASIC PARAMETERS		OTHER PARAMETERS	
parameter	value	worker	date	type of service	price (Σ 1 191 Kč)	parameter	value	parameter	value
hours worked, total	206.23 hour	Josef	31.12.2016	Mazivo	525 Kč	Name	GAQ818-230BX(E5)	classification	
hours worked, load	206.23 hour	Show more		Kontrola těsnosti převodovky	666 Kč	type	Bruska úhlová GAQ818-230BX	date of introduction into production	1.1.2016
total air consumption	23758.02 m ³			Show more		serial number	16/70122250	last service date	6.6.2016
						weight	4.40 kg	last registration - date	9.6.2016
						speed	8000.00 rpm	end of warranty	0.0.0000
						diameter of grinding wheel	180.00 mm	service - total costs	1191 Kč
						air consumption	2.50 m ³ /min		
						power	2300.00 W		



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Automation

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DIQ application and Industry 4.0 – Actual information



- Online status
- Continuous speed control
- Permanent tool condition monitoring
- Service intervals based on actual conditions
- Potential problem warnings

	tools	name of worker	condition	company	hours	loaded	service
1	GAQ818-230BX(E9)	František Broušivý	OK		50.49	30.5.2016 7:20:32	19.5.2016 9:10:19
2	GAQ818-230BX(E5)	Josef Novák	OK		206.23	9.6.2016 3:29:36	6.6.2016 8:27:01
3	GAQ818-230BX(87)		OK		612	30.3.2016 0:00:00	2.6.2016 13:30:13



DIQ application and Industry 4.0 – Evaluation and reports



Visualization of the

- working effectivity
- optimal grinding speed
- tool loading or potential overloading
- average and total air consumption
- ambient temperature peaks
- work off hours

All data displayed in the time scale.

FAST FILTERS

subject

- effectivity
- optimal speed
- air consumption – total
- air consumption – average
- work load
- worked time
- Temperature history
- Batory status

group by

- tools
- worker

erase filter and activate

time span

- day
- week
- month
- year

april

2016

choice of tool

GAQ818-230BX(E9)
GAQ818-230BX(E5)
GAQ818-230BX(87)

cancel choose

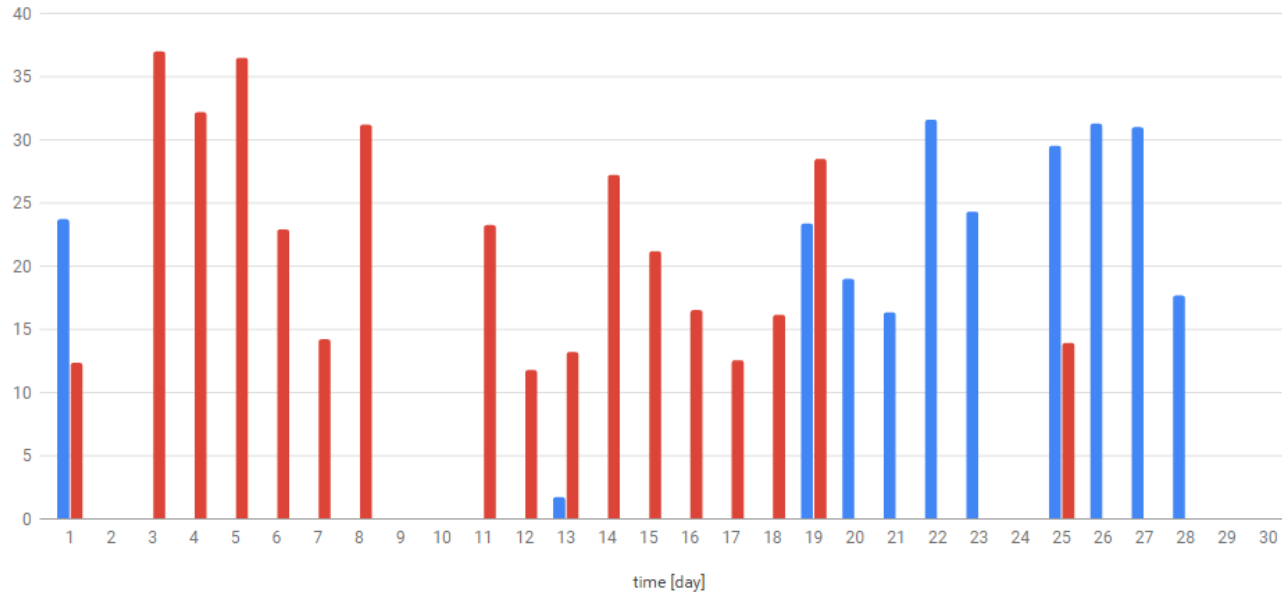


DIQ application and Industry 4.0 – Evaluation and reports



Comparing effectivity of tools

effectivity [%]



subject

- effectivity
- optimal speed
- air consumption – total
- air consumption – average
- work load
- worked time
- Temperature history
- Bateria status

group by

- tools
- worker

time span

- day
- week
- month
- year

april 2016

choice of tool

- GAQ818-230BX(E9)
- GAQ818-230BX(E5)
- GAQ818-230BX(87)

cancel choose

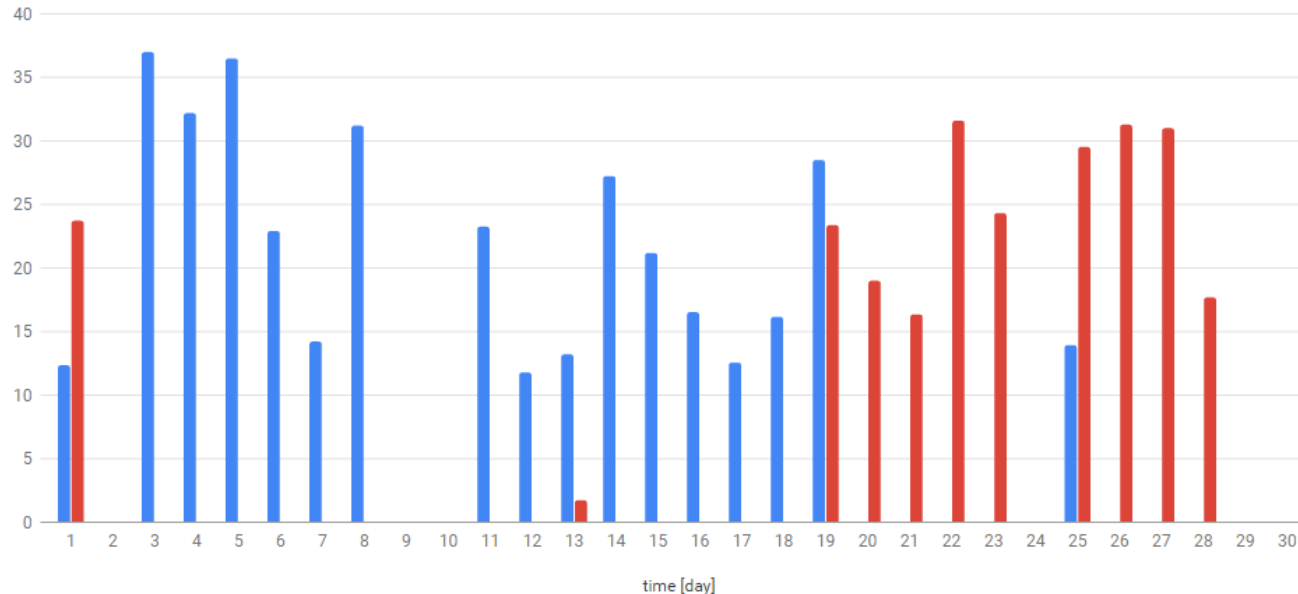


DIQ application and Industry 4.0 – Evaluation and reports



...or workers

effectivity
[%]



■ Josef Novák
■ František Brousvý

subject

- effectivity
- optimal speed
- air consumption – total
- air consumption – average
- work load
- worked time
- Temperature history
- Battery status

group by

- tools
- worker

time span

- day
- week
- month
- year

april 2016

choose workers

Josef Novák
František Brousvý

cancel choose



■ DIQ application and Industry 4.0 – Key advantages



- The tools are under your supervision all time
- Availability of all working data
- Full control of the air tool and process
- Recommends, how to use the tool to get optimal results
- Recommends, which tool is the best for the process
- Comparison of workers – comparison of tools
- Continuous monitoring of the tool status
- Guiding to reach optimal efficiency, grinding speed and load
- Control maintenance intervals as well as maintenance costs
- Working hours
- Full access to the air consumption for better production planning
- Save energy and costs!!!



Screwdriving Technology

Automation

Air Motors

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■ DIQ application and Industry 4.0 – Tools availability



GAQ818-250BX



GAQ812-190BX



GAQ815-190BX



GAQ823-250BX



GAQ818-190BX



GAQ823-190BX





DEPRAG

Thank you

