

## Torque Wrench Control SLTC-FM / PTV-FM 2.4 GHz



**SLTC-FM radio torque wrenches** wirelessly transmit the click signal on 2.4 GHz Band, ranging about up to 16 meters. Within 12 FM channels each SLTC-FM wrench is individually addressed, thus no interference occurs even at simultaneous use of several PTV's with multiple FM switch wrenches (relative signal strength available in the PTV). To ensure transmission each cycle signal is sent up to 5 times, approx. 30 milliseconds each. The receipt is confirmed via bi-directional communication.

- Power supply via 12V battery for up to 50 000 cycles. Low battery alarm.
- No charging station needed for FM wrenches, thus saving ways and time at work.
- Accuracy of  $\pm 4\%$  of preset value from 20% to 100% of capacity meets or exceeds requirements of ASME B107.300-2010 and ISO 6789.
- Provides immediate on-tool feedback on quality of each use through red/green LED.
- Excellent audible/tactile impulse when preset torque is achieved.

The **Programmable Torque Verifier PTV-FM** monitors the proper use of up to 4 SLTC-FM clicker wrenches by parameterization of 4 time slots: minimum/maximum click duration, between cycles, between batches. Thus the possibility of „jerk“ the wrench or overtorque a fastener is eliminated, the error rate

is reduced and the productivity is improved. The 19-Pin Amphenol connector enables the integration into an automated line control system and thus also documenting of security related joints.

The PTV-FM is ideal for the line integration of manual clicker wrenches, as Backup for multi-spindle nut runners or as QA single solution for multiple tightenings as well as a training station for (new) employees. A key lock switch protects the equipment against unauthorized change of programming.

- Each specification set (parameter) can be used on any of up to 4 tools tied to the unit.
- Tool use sequencing can be controlled through the unit or by PLC via DC 24V I/O port.
- Counting fasteners in batch either up (completed correctly) or down (to be tightened), thus missing is eliminated.
- Allows up to 999 fasteners per batch.
- Immediately informs operator via lights and buzzer of proper (Accept) or improper (Reject) wrench use. Optionally a multi-coloured light signal stack can be implemented.
- Large clear Display supplemented by 6 green/red LED's for modes and/or actions.
- Simple and straightforward front panel programming with security control.
- Power output: SLTC-FM = 1 mW; PTV-FM = 10-60 mW.

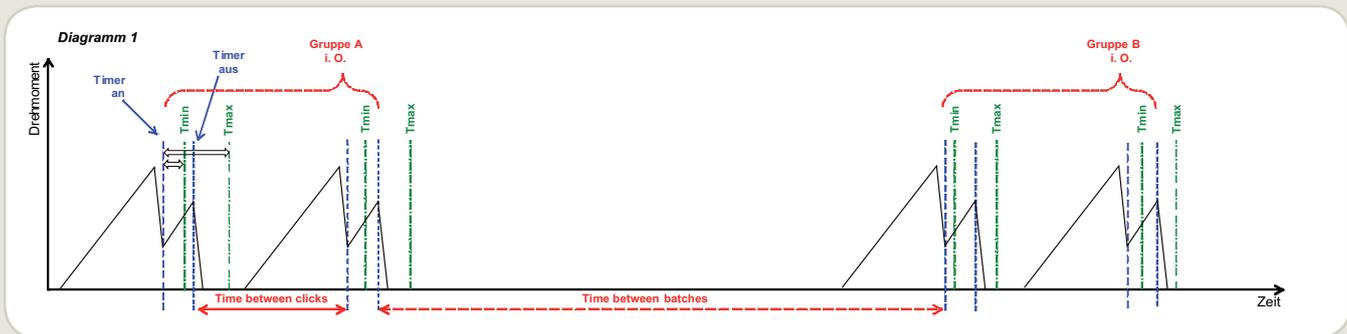
Model	Item No.	Communication	Description	Price €	PG
PTV FM 2.4	R10466	wireless, FM signal 2.4 GHz	Programmable Torque Verifier for up to 4 Series SLTC-2.4FM wrenches	2530.00	10

Model	Item No.	Torque Range acc. ISO 6789		Head Adaptor	Length mm	Price €	PG
		lbf-in	N-m				
SLTC 2.4FM 50i	R810311	10 - 50	1.2 - 5.6	Dovetail	175	798.00	10
SLTC 2.4FM 150i	R810312	30 - 150	3.4 - 17	Dovetail	175	798.00	10
SLTC 2.4FM 0HT	R810310	60 - 300	6.8 - 34	Dovetail	175	809.00	10
SLTC 2.4FM 300i	R810313	30 - 300	6.8 - 34	Dovetail	224	809.00	10
SLTC 2.4FM 750i	R810314	150 - 750	17 - 85	Dovetail	319	825.00	10
SLTC 2.4FM 1800i	R810315	360 - 1800	41 - 203	Dovetail	405	851.00	10
SLTCR 2.4FM 3000i	R810316	600 - 3000	68 - 339	1/2" RT	581	904.00	10
SLTC 2.4FM 3600i	R810317	720 - 3600	81 - 407	Dovetail	618	1223.00	10
SLTC 2.4FM 4800i	R810318	960 - 4800	108 - 540	Dovetail	872	1330.00	10
SLTCR 2.4FM 7200i	R810319	1440 - 7200	162 - 813	3/4" RT	949	1330.00	10

(Any stated prices are valid per unit in Euro plus VAT and/or any custom fees exw Hamburg, incl. package. Subject to change. Errors excepted.)

ZEMO Vertriebs GmbH · Telefon: +49 (0)40.789181-02 · Telefax: +49 (0)40.789181-12 · E-Mail: info@zemo-tools.de

# Torque Wrench Control – Monitoring Principles



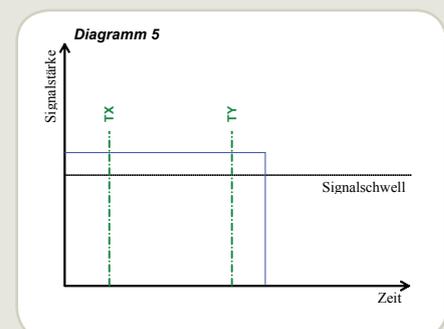
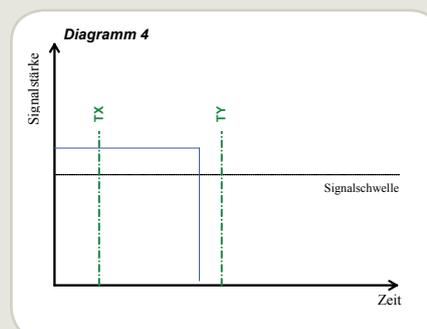
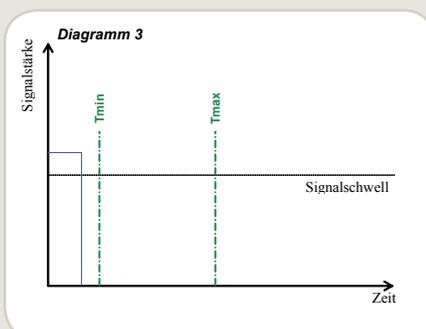
When a torque wrench is operated on a fastener, the wrench spends a certain amount of time in the “clicked” position; thus a small **time slot** occurs between releasing and easing the wrench. The FM Switch Wrench has a timer that measures the duration of a click (cycle) of the wrench. The PTV-FM compares the duration of the click to the T-min and T-max specification limits and immediately communicates to the operator the acceptability of that use of the wrench.

- Diagram 1** (above) schematizes the torque process during several click cycles. As soon as the wrench clicks a timer on the wrench starts measuring time. Timer stops when pressure on the wrench is released and the wrench resets. By determination of the appropriate time interval, which the key is to be in the „clicked“ position, a time window can be specified for this condition over T-min and T-max.
- Diagram 3** (b.l.) shows a cycling, where the wrench was „jerked“, so torque was applied too quickly. Signal strength exceeds the threshold, but the given minimum time (T-min) has not been achieved.
- Diagram 4** (b.m.) illustrates the cycle of a clicker wrench, which was appropriately pulled. The signal ends within the time slot, which is formed by the given minimum (TX) and maximum (TY) time limit.
- Diagram 5** (b.r.) represents a torque cycle, which exceeds the permitted maximum time. This happens, if the torque wrench is pulled far beyond the point of break, overtightening the fastener – one of the most occurring improper techniques.
- Time Between Clicks (TBC)** is the minimum time interval between the individual click procedures of the torque wrench. This timer starts on completion of each torque cycle. If the torque wrench is cycled again, before the programmed time interval ran off, this torque cycle is rejected and the exceeded parameter set is signaled instantly.
- Time Between Batches (TBB)** is the minimum time interval between different groups of fasteners. This timer starts on completion of a group release. If the torque wrench is cycled again, before the preset time interval ran off, this torque cycle is rejected and the exceeded parameter set is immediately signaled by the PTV.

**Sequencing** can be used for operations that require multiple wrenches with different torque settings and/or head fittings be used in a fixed sequence (A-B, A-B-C, A-B-C-D). If sequencing is enabled, the PTV-FM will switch from one parameter set in the sequence to the next parameter set when the batch limit is met in the first parameter set. When the batch limits are met for all parameter sets in the sequence, the PTV-FM will issue a batch accept and return to parameter set A.

**Low-Battery-Alarm** alerts the operator when the battery charge on the wrench falls below a certain threshold and should be removed and replaced with a fresh battery. The limit is displayed as a percentage from 0% to 99% and can be adjusted.

The programmed parameters of the individual Switch Wrench are manually displayable in the PTV's display at any time, as for example FM channel, battery strength, signal strength, cycle duration time, number of click cycles of the used torque wrench, total number of click cycles etc.



(Any stated prices are valid per unit in Euro plus VAT and/or any custom fees exw Hamburg, incl. package. Subject to change. Errors excepted.)

ZEMO Vertriebs GmbH · Telefon: +49 (0)40.789181-02 · Telefax: +49 (0)40.789181-12 · E-Mail: info@zemo-tools.de