3.4.10 FRANCE

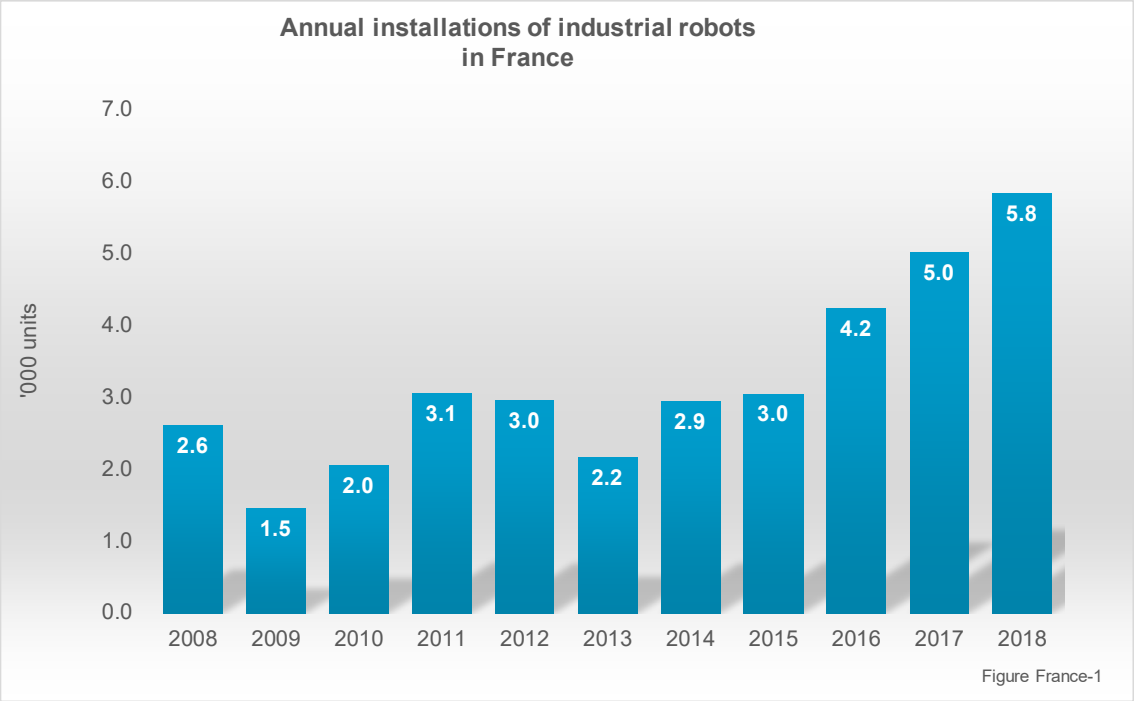

Figure France-1

Sales

- 5,829 new robots installed, 16% higher than in 2017
- CAGR 2013-2018: +22%
- Global ranking 2018: No. 8
- Shares of total installations:
  Handling operations 67%, welding 16%
  Automotive industry 35%, metal industry 15%, electrical/electronics industry 13%

Stock of operational robots

- About 38,100 units, 8% higher than in 2017
- CAGR 2013-2018: +3%
- Global ranking 2018: No. 8
- Shares of total stock:
  Handling operations 56%, welding 20%
  Automotive industry 37%, metal industry 14%, plastic and chemical industry 11%

Robot density

- Manufacturing industry: 154 robots per 10,000 employees
- Automotive industry: 1,239 robots per 10,000 employees
- All others: 102 robots per 10,000 employees

Sources and methods

Since 2005, the statistics for France have been based solely on data reported directly to the IFR Statistical Department by robot suppliers worldwide. Prior to 2005, the statistical

data was based on information provided by SYMOP (Syndicat des Machines et Technologies de Production), France.

Installations and total operational stock

The French robot market ranked third in Europe in 2018 regarding annual installations and operational stock, following Italy and Germany. **In 2018, robot installations increased by 16% to 5,829 units - again a new peak level.** The largest customer industry is automotive with a share of almost 35% (2,014 units; +32%) of installations in 2018. In the general industry, installations increased by 36% to 3,363 units (2017: 2,471 units). The average annual growth rate (CAGR) from 2013 to 2018 in the general industry was 32% while it was 30% in the automotive industry.

After 2000, a record year with 3,700 units installed, annual robot sales started to decline. Between 2000 and 2009, the automotive industry (main customer of industrial robots) continuously reduced robot installations. Companies were either focusing on investing in emerging markets or shifting production to more cost-efficient locations. Since 2010, governmental initiatives to strengthen production in France have resulted in substantial investments by the automotive industry and by most of the general industry. Because of the declining number of installations, robot density in the automotive industry has been dwindling from 1,540 units per 10,000 employees in 2011 to 1,156 units per 10,000 employees in 2017. In 2018, it increased to 1,239 units, a value similar to that of its neighbor, Germany (1,268 units). Robot density in the general industry further increased to 102 units per 10,000 employees in 2018 from 59 units per 10,000 employees in 2011 (for more information see Chapter 2.5).

The **operational stock of robots** is calculated at 38,079 units, an 8% increase over the previous year (see figures France-3 and -4).

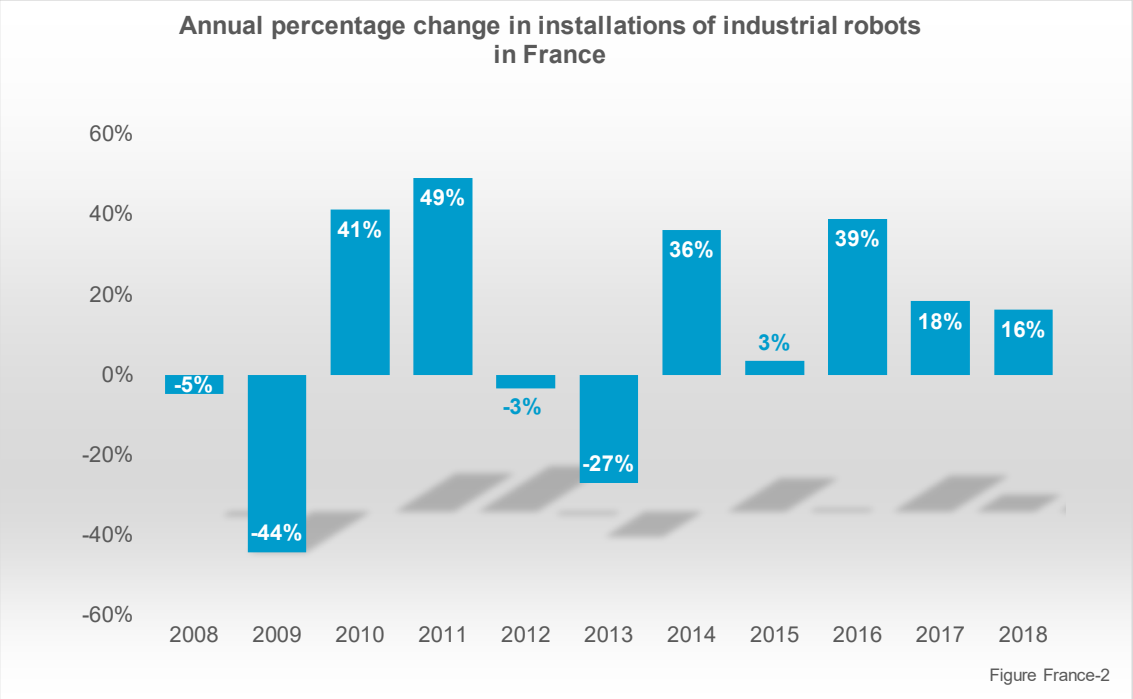

Figure France-2

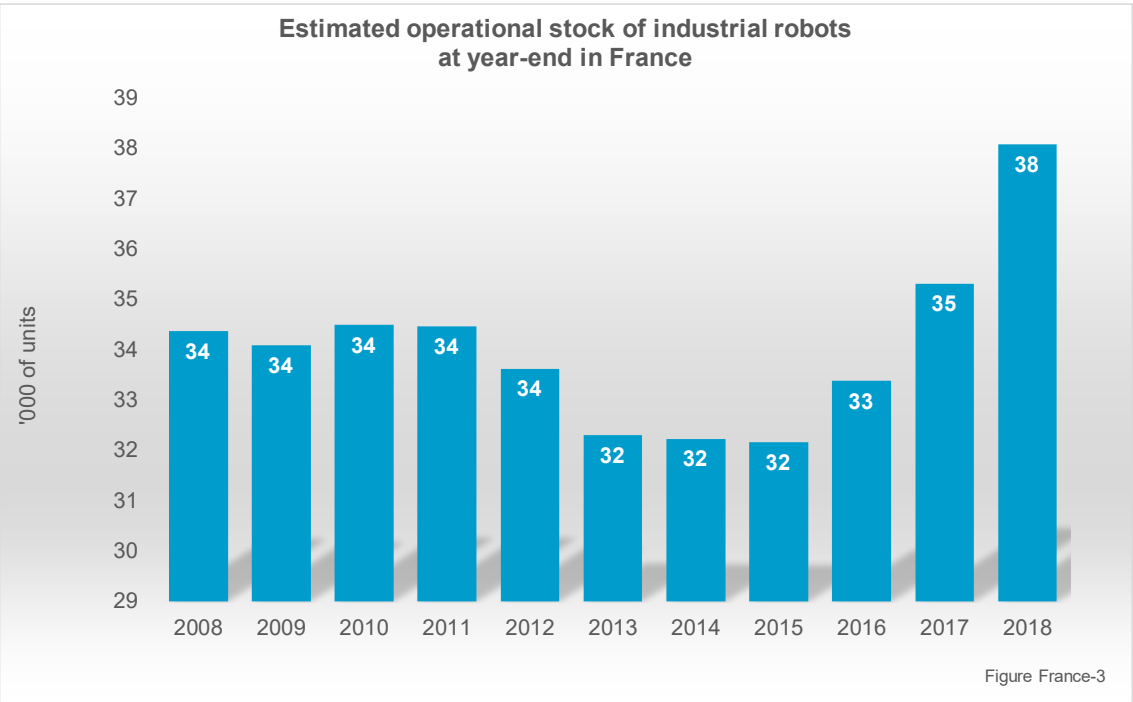

Figure France-3

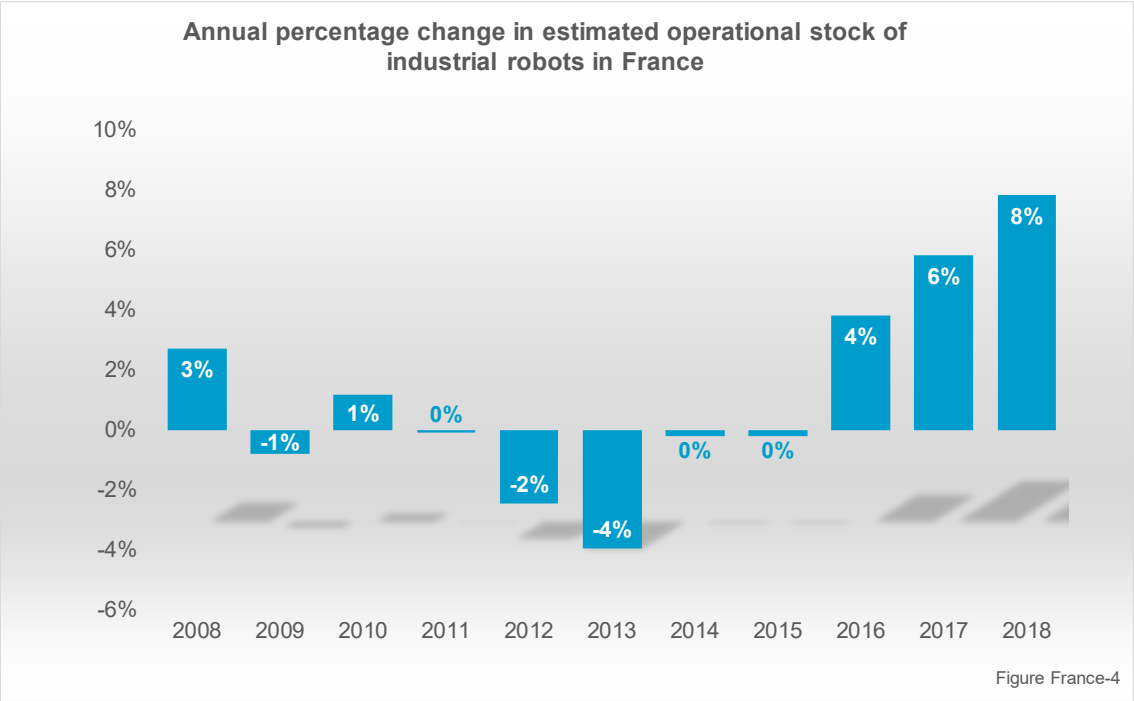

Figure France-4

Application areas

Handling operations and machine tending continued to increase in 2018 by 37% to 3,897 units. The share of total installations was 67%. The second quantitatively relevant application is **welding**, with 42% more robots (924 units) and 16% of total installations. The change rates for individual applications should be interpreted with caution. They could be biased upwards, because the base level (i.e. installations in 2017) is probably too low. In 2017, 23% of the total installations were reported without information on the application (application class 999 - “unspecified”). This share was much lower (8%) in 2018. The total number of installations, however, is not affected.”

For more details see table France.APP-1 and figure France-5.

Table France.APP-1

Annual installations of industrial robots. Unit distribution by application areas

IFR Class	Application area	2013	2014	2015	2016	2017	2018	2018/ 2017	CAGR 2013 - 2018
110	**Handling operations/ Machine tending**	**1,170**	**1,549**	**1,857**	**2,231**	**2,846**	**3,897**	**37%**	**27%**
111	Handling operations for metal casting	40	46	18			73		13%
112	Handling operations for plastic moulding	323	385	472	493	644	603	-6%	13%
113	Handling operations for stamping/forging/ bending	10	8		22		29		24%
114	Handling operations at machine tools	54	58	68		128	168	31%	25%
115	Machine tending for other processes	76	100				874		63%
116	Handling operations for measurement, inspection, testing	24	35	26	49	76	99	30%	33%
117	Handling operations for palletizing	107	132	141	194	235	226	-4%	16%
118	Handling operations for packaging, picking and placing	158	299	302	397	474	603	27%	31%
119	Material Handling n.e.c.	378	486	782	913	992	1,222	23%	26%
120	Handling operations/ Machine tending unspecified			48	163	297			
160	**Welding and soldering (all materials)**	**204**	**781**	**483**	**713**	**650**	**924**	**42%**	**35%**
161	Arc welding	110	207	178	290	275	284	3%	21%
162	Spot welding	69	326	183	400	302	606	101%	54%
163	Laser welding	6					7		3%
164	other welding	18	247		23				
165	Soldering	1	1						
166	Welding and soldering unspecified			122		73	27	-63%	
170	**Dispensing**	**62**	**95**	**42**	**98**	**94**	**68**	**-28%**	**2%**
171	Painting and enamelling	38	53	42	64	69	36	-48%	-1%
172	Application of adhesive, sealing material or similar material	7	24			25			
179	Dispensing others/ Spraying others	17	18		34				
180	Dispensing unspecified						32		
190	**Processing**	**48**	**45**	**107**	**116**	**87**	**192**	**121%**	**32%**
191	Laser cutting								
192	Water jet cutting	2	1						
193	Mechanical cutting/grinding/ deburring/ milling/polishing	30	36	70	71	71	59	-17%	14%
198	Other processing	16	8				122		50%
199	Processing unspecified			37	45	16	11	-31%	
200	**Assembling and disassembling**	**44**	**50**	**103**	**85**	**159**	**299**	**88%**	**47%**
201	Fixing, press-fitting	8	10	25	16	12	16	33%	15%
202	Assembling/ mounting/ inserting	34	36	78	69	147	283	93%	53%
203	Disassembling								
208	Other assembling	2	4						
209	Assembling and disassembling unspecified								
900	**Others**	**193**	**121**		**192**				
901	Cleanroom for FPD								
902	Cleanroom for semiconductors	3							
903	Cleanroom for others	2							
905	Others	188	121		192				
999	**Unspecified**	**440**	**303**	**453**	**797**	**1,178**	**449**	**-62%**	**0%**
	TOTAL	**2,161**	**2,944**	**3,045**	**4,232**	**5,014**	**5,829**	**16%**	**22%**

Since 2010, the **stock of operational robots** for **welding** has been decreasing but it still accounts for 20% of the total stock. The stock of robots for **assembling** has stabilized its downtrend and is increasing again. The stock of robots for **handling operations and machine tending** increased by 12% and represents 56% of the total operational stock. For more details see table France.APP-2 and figure France -6.

Table France.APP-2

Operational stock of industrial robots at the end of the year. Unit distribution by application areas

IFR Class	Application area	2013	2014	2015	2016	2017	2018	2018/ 2013	CAGR 2013 - 2018
110	**Handling operations/ Machine tending**	**16,181**	**16,486**	**16,929**	**17,713**	**19,129**	**21,406**	**12%**	**6%**
111	Handling operations for metal casting	1,069	1,040	998	927	904	789	-13%	-6%
112	Handling operations for plastic moulding	3,818	3,921	4,086	4,222	4,445	4,633	4%	4%
113	Handling operations for stamping/forging/ bending	255	263	281	303	260	222	-15%	-3%
114	Handling operations at machine tools	1,899	1,635	1,327	1,071	1,110	1,072	-3%	-11%
115	Machine tending for other processes	1,046	1,051	1,027	1,115	1,289	2,134	66%	15%
116	Handling operations for measurement, inspection, testing	264	287	310	342	381	455	19%	12%
117	Handling operations for palletizing	1,901	1,884	1,867	1,839	1,884	1,945	3%	0%
118	Handling operations for packaging, picking and placing	1,608	1,907	2,209	2,606	3,007	3,455	15%	17%
119	Material Handling n.e.c.	4,321	4,498	4,824	5,288	5,849	6,701	15%	9%
120	Handling operations/ Machine tending unspecified								
160	**Welding and soldering (all materials)**	**10,323**	**9,629**	**8,720**	**8,248**	**7,786**	**7,715**	**-1%**	**-6%**
161	Arc welding	3,074	2,917	2,750	2,737	2,738	2,755	1%	-2%
162	Spot welding	6,707	5,937	5,077	4,597	4,067	3,953	-3%	-10%
163	Laser welding	52	52	55	55	50	57	14%	2%
164	other welding	479	711	826	845	916	924	1%	14%
165	Soldering	11	12	12	14	15	26	73%	19%
166	Welding and soldering unspecified								
170	**Dispensing**	**1,637**	**1,654**	**1,629**	**1,561**	**1,469**	**1,334**	**-9%**	**-4%**
171	Painting and enamelling	1,146	1,121	1,065	999	921	832	-10%	-6%
172	Application of adhesive, sealing material or similar material	410	434	459	423	405	339	-16%	-4%
179	Dispensing others/ Spraying others	75	93	99	133	143	163	14%	17%
180	Dispensing unspecified	6	6	6	6				
190	**Processing**	**847**	**827**	**862**	**941**	**996**	**1,131**	**14%**	**6%**
191	Laser cutting	3	3	4	8	12	19	58%	45%
192	Water jet cutting	17	18	24	26	28	31	11%	13%
193	Mechanical cutting/grinding/ deburring/ milling/polishing	416	395	411	463	510	536	5%	5%
198	Other processing	411	411	423	444	446	544	22%	6%
199	Processing unspecified						1		
200	**Assembling and disassembling**	**1,242**	**1,189**	**1,171**	**1,108**	**1,200**	**1,413**	**18%**	**3%**
201	Fixing, press-fitting	494	460	402	321	310	285	-8%	-10%
202	Assembling/ mounting/ inserting	665	647	690	715	808	1,051	30%	10%
203	Disassembling	4	4	4	4	4	1	-75%	-24%
208	Other assembling	79	78	75	68	78	76	-3%	-1%
209	Assembling and disassembling unspecified								
900	**Others**	**763**	**847**	**948**	**1,130**	**1,088**	**1,112**	**2%**	**8%**
901	Cleanroom for FPD								
902	Cleanroom for semiconductors	22	22	22	22	22	7	-68%	-20%
903	Cleanroom for others	3	3	3	3	3	3		
905	Others	738	822	923	1,105	1,063	1,102	4%	8%
999	**Unspecified**	**1,308**	**1,601**	**1,902**	**2,683**	**3,653**	**3,968**	**9%**	**25%**
	TOTAL	**32,301**	**32,233**	**32,161**	**33,384**	**35,321**	**38,079**	**8%**	**3%**

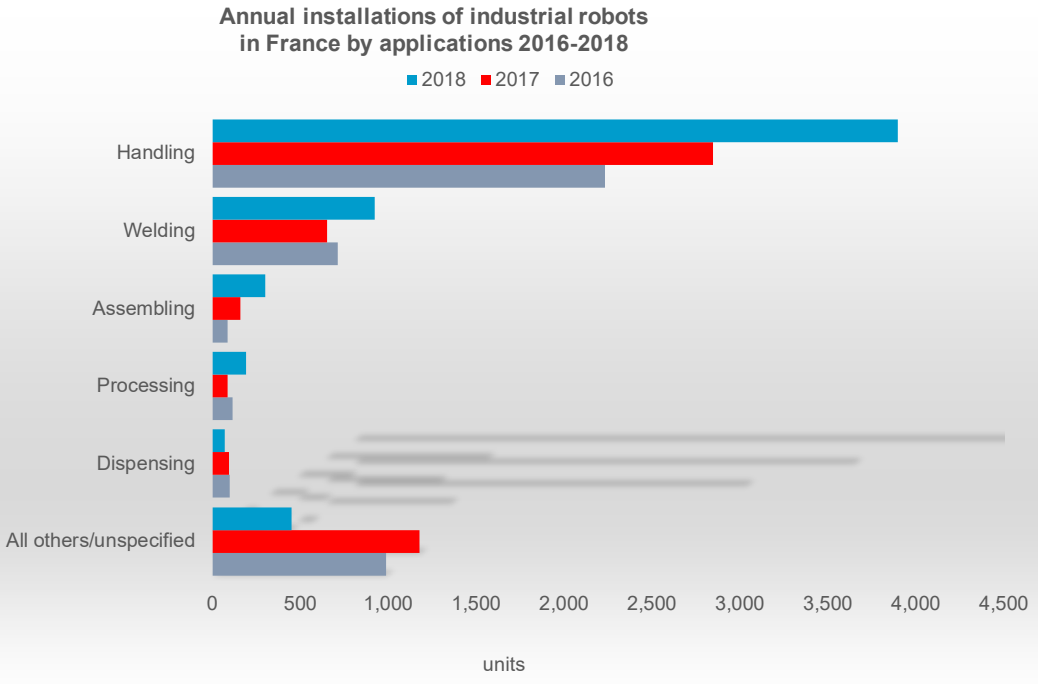

Figure France-5

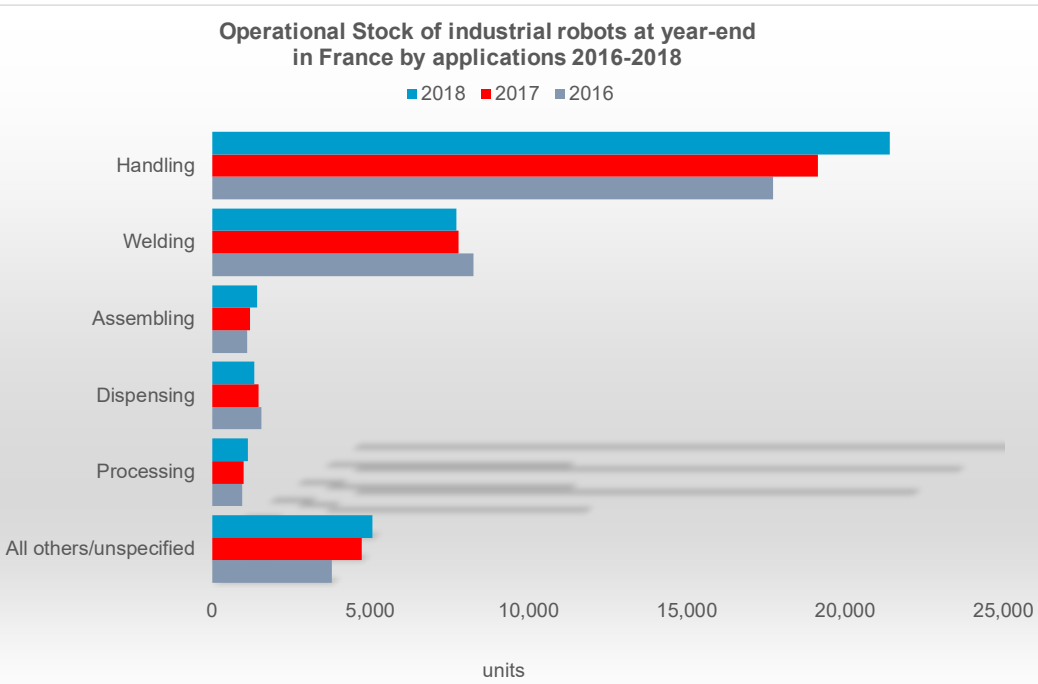

Figure France-6

Industries

Annual robot installations in the **automotive industry** grew by 32% to 2,014 units. This includes car manufacturers (947 units; +39%) and automotive parts suppliers (1,067 units; +26%). The general industry has also considerably increased its robot installations: The **metal and machinery industry** installed almost 900 units (+38%) and the **plastics and chemical products industry** installed 642 units (+17%). The increase of installations in the **electronics industry** (732 units; +289%) is mainly a statistical effect caused by changes in reporting (see table France.BRA-1 and figure France-7).

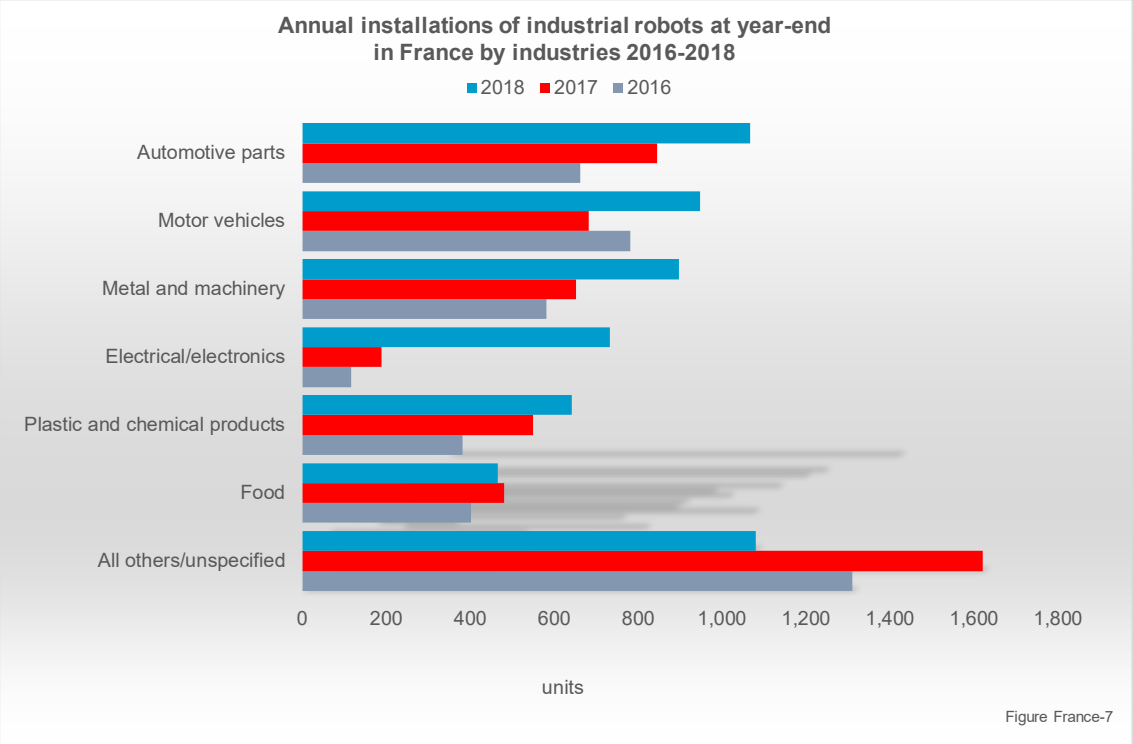

Figure France-7

Table France.BRA-1

Annual installations of industrial robots. Unit distribution by industrial branches

IFR class	Categories, divisions and classes of economic activities, ISIC, rev. 4	2013	2014	2015	2016	2017	2018	2018/ 2017	CAGR 2013 - 2018
A-B	Agriculture, hunting and forestry; fishing	6	2						
C	Mining and quarrying								
D	Manufacturing	1,340	2,549	2,634	3,286	3,884	5,185	33%	31%
10-12	Food products and beverages; Tobacco products	178	304	295	402	480	465	-3%	21%
13-15	Textiles, leather, wearing apparel	8	2						
16	Wood and wood products (incl. furniture)	17	21	23	38				
17-18	Paper and paper products, publishing & printing	47	43		13	34	45	32%	-1%
19-22	Plastic and chemical products	145	377	376	381	549	642	17%	35%
19	Chemical products, pharmaceuticals, cosmetics	36	85	83	91	127	200	57%	41%
20-21	Unspecified chemical, petrolium products	5	1						
22	Rubber and plastic products without automotive parts*	104	291	293	290	422	442	5%	34%
229	Chemical products unspecified								
23	Glass, ceramics, stone, mineral products n.e.c. (without automotive parts*)	29	25	27	67	75	52	-31%	12%
24-28	Metal	212	463	366	581	651	897	38%	33%
24	Basic metals (iron, steel, aluminium, copper, chrome)	56	92	66	73		82		8%
25	Metal products (without automotive parts*), except machinery and equipment	108	189	139	177	189	277	47%	21%
28	Industrial machinery	48	182	161	331	462	538	16%	62%
289	Metal unspecified								
26-27	Electrical/electronics	66	101	66	116	188	732	289%	62%
275	Household/ domestic appliances	4	31						
271	Electrical machinery and apparatus n.e.c. (without automotive parts*)	4	11		12	32	33	3%	53%
260	Electronic components/devices	12	8			80	114	43%	57%
261	Semiconductors, LCD, LED (incl solar cells and solar thermal collectors)	1							
262	Computers and peripheral equipment	8	12						
263	Info communication equipment domestic and professional (TV, radio, CD, DVD-Players, pagers, mobile phones, VTR etc.) without automotive parts*	21	6				32		9%
265	Medical, precision and optical instruments	16	26				511		100%
279	Electrical machinery unspecified		7	66	104	76	42	-45%	
29	Automotive	551	1,121	1,185	1,443	1,526	2,014	32%	30%
291	Motor vehicles, motor vehicle engines and bodies	353	733	611	781	682	947	39%	22%
293	Parts and accessories for motor vehicles:	198	388	574	662	844	1,067	26%	40%
2931	Metal products	76	147	244	158	374	593	59%	51%
2932	Rubber and plastic	43	212	242	294	371	336	-9%	51%
2933	Electrical/electronics	24	18		58	50	89	78%	30%
2934	Glass	2							
2939	Other	50	11	67	152				
2999	Parts and accessories unspecified	3		21		49	49		75%
299	Automotive unspecified								
30	Other transport equipment	64	60	101	92	74	84	14%	6%
91	All other manufacturing branches	23	32	195	153	307	254	-17%	62%
E	Electricity, gas and water supply	1	1						
F	Construction	15	45		45				
P	Education, research and development	39	23	32	61		120		25%
90	All other non-manufacturing branches		1	33	27	113	72	-36%	
99	Unspecified	760	323	346	813	1,017	452	-56%	-10%
	TOTAL	2,161	2,944	3,045	4,232	5,014	5,829	16%	22%

* as far as known

For nine years, the **operational stock of robots** in the **automotive industry** has continuously decreased, from its peak of 20,900 units in 2008 to 13,443 units in 2017. In 2018, it increased by 3% to 13,898 units. It accounts for 37% of the total stock. The stock of robots in the **metal and machinery industry** accounts for 13% of the total stock and increased in 2018 by 11% to 5,136 units. The stock of robots in the **plastics and chemical products industry** increased by 3% to 4,327 units; and the stock in the **food and beverage industry** by 7% to 3,840 units (cf. table France.BRA-2 and figure France-8).

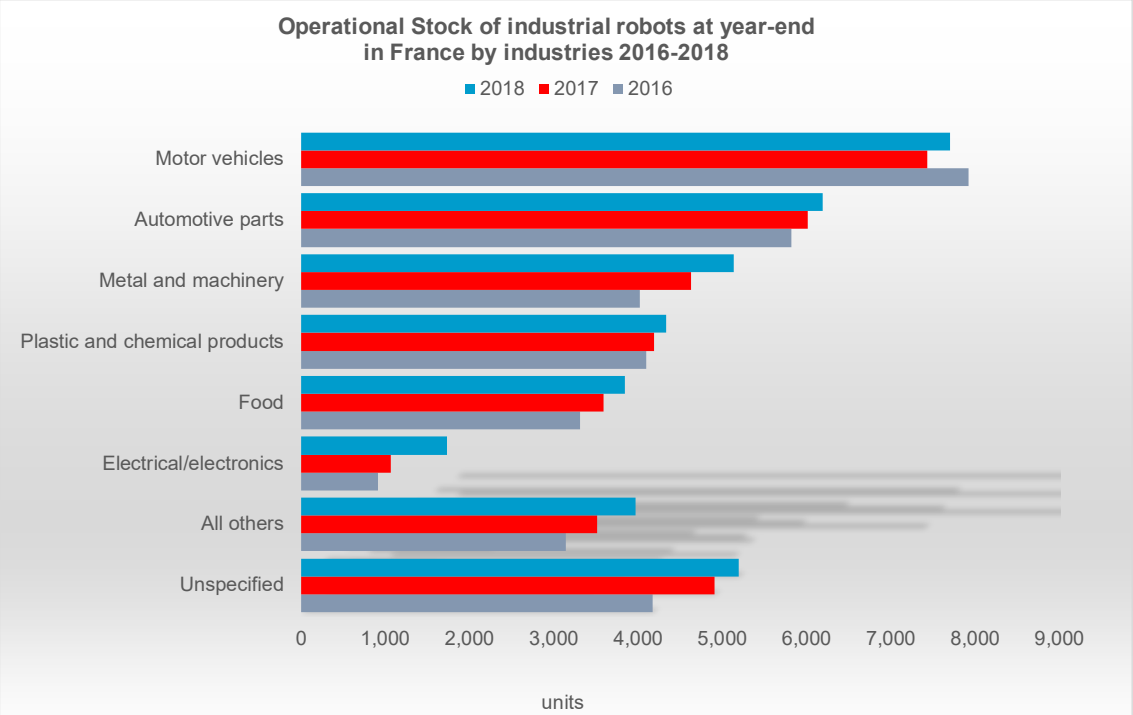

Figure France-8

Table France.BRA-2

Operational stock of industrial robots at the end of the year. Unit distribution by industrial branches

IFR class	Categories, divisions and classes of economic activities, ISIC, rev. 4	2013	2014	2015	2016	2017	2018	2018/ 2013	CAGR 2013 - 2018
A-B	Agriculture, hunting and forestry; fishing	43	45	50	50	39	50	28%	3%
C	Mining and quarrying	20	20	21	22	22	20	-9%	
D	Manufacturing	29,102	28,695	28,246	28,529	29,657	31,955	8%	2%
10-12	Food products and beverages; Tobacco products	2,754	2,930	3,099	3,306	3,589	3,840	7%	7%
13-15	Textiles, leather, wearing apparel	58	50	45	41	46	54	17%	-1%
16	Wood and wood products (incl. furniture)	149	158	168	198	214	222	4%	8%
17-18	Paper and paper products, publishing & printing	348	382	418	420	446	472	6%	6%
19-22	Plastic and chemical products	3,724	3,856	3,993	4,092	4,185	4,327	3%	3%
19	Chemical products, pharmaceuticals, cosmetics	381	466	549	598	710	896	26%	19%
20-21	Unspecified chemical, petrolium products	33	34	36	37	38	49	29%	8%
22	Rubber and plastic products without automotive parts*	2,824	3,115	3,408	3,457	3,437	3,382	-2%	4%
229	Chemical products unspecified	486	241						
23	Glass, ceramics, stone, mineral products n.e.c. (without automotive parts*)	494	468	448	493	527	489	-7%	0%
24-28	Metal	3,581	3,777	3,841	4,018	4,628	5,136	11%	7%
24	Basic metals (iron, steel, aluminium, copper, chrome)	510	561	586	579	666	718	8%	7%
25	Metal products (without automotive parts*), except machinery and equipment	1,997	2,118	2,167	2,209	2,313	2,251	-3%	2%
28	Industrial machinery	745	927	1,088	1,230	1,649	2,167	31%	24%
289	Metal unspecified	329	171						
26-27	Electrical/electronics	840	876	889	912	1,062	1,726	63%	15%
275	Household/ domestic appliances	143	174	200	239	235	251	7%	12%
271	Electrical machinery and apparatus n.e.c. (without automotive parts*)	219	230	238	157	188	198	5%	-2%
260	Electronic components/devices	134	142	162	177	248	355	43%	22%
261	Semiconductors, LCD, LED (incl solar cells and solar thermal collectors)	51	51	51	72	72	70	-3%	7%
262	Computers and peripheral equipment	18	30	30	33	33	42	27%	18%
263	Info communication equipment domestic and professional (TV, radio, CD, DVD-Players, pagers, mobile phones, VTR etc.) without automotive parts*	45	51	52	52	74	106	43%	19%
265	Medical, precision and optical instruments	112	138	149	175	195	687	252%	44%
279	Electrical machinery unspecified	118	60	7	7	17	17		-32%
29	Automotive	16,282	15,272	14,199	13,744	13,443	13,898	3%	-3%
291	Motor vehicles, motor vehicle engines and bodies	9,977	9,274	8,399	7,920	7,429	7,704	4%	-5%
293	Parts and accessories for motor vehicles:	6,305	5,998	5,800	5,820	6,010	6,190	3%	0%
2931	Metal products	678	825	1,069	1,227	1,601	2,194	37%	26%
2932	Rubber and plastic	653	865	1,107	1,401	1,772	2,108	19%	26%
2933	Electrical/electronics	208	226	242	300	350	439	25%	16%
2934	Glass	8	8	13	15	23	39	70%	37%
2939	Other	164	175	242	394	435	468	8%	23%
2999	Parts and accessories unspecified	4,594	3,899	3,127	2,483	1,829	942	-48%	-27%
299	Automotive unspecified				4	4	4		
30	Other transport equipment	400	422	499	551	611	677	11%	11%
91	All other manufacturing branches	472	504	647	754	906	1,114	23%	19%
E	Electricity, gas and water supply	9	10	10	24	27	40	48%	35%
F	Construction	138	183	198	243	256	262	2%	14%
P	Education, research and development	183	206	238	299	358	467	30%	21%
90	All other non-manufacturing branches	19	20	32	44	60	96	60%	38%
99	Unspecified	2,787	3,054	3,366	4,173	4,902	5,189	6%	13%
TOTAL		32,301	32,233	32,161	33,384	35,321	38,079	8%	3%

* as far as known

Types of robots

Table France.Types

Domestic installations of industrial robots by type. Number of units

Year	2013	2014	2015	2016	2017	2018	2018/ 2017	CAGR 2013 - 2018
Type of robot by mechanical structure	units	units	units	units	units	units	%	%
Articulated	1,691	2,370	2,389	3,506	4,065	4,711	16%	23%
Linear/cartesian/gantry	318	375	468	473	580	488	-16%	9%
Parallel/delta	84	156	144	181	212	276	30%	27%
SCARA	67	43	44	66	154	346	125%	39%
Others (e.g. cylindrical)	1	0	0	6	3	8	167%	52%
Total	**2,161**	**2,944**	**3,045**	**4,232**	**5,014**	**5,829**	**16%**	**22%**

Outlook 2019 and beyond

The French economy is stable with real GDP growth of 1.4% in 2019. Despite global economic uncertainties, French companies are willing to invest, especially in digitalization.[63] Several car manufacturers have announced investments in capacity expansion. Investments by the general industry is expected to increase by 5% in 2018. Despite high unemployment, industry complains over a lack of qualified personnel. This in conjunction with the need for modernization will lead to an increase in demand for robotics and automation solutions in the next few years.

For 2019 a strong growth of 10% or more can be expected because of the two different tax incentives for corporate investments: a retroactive tax credit and a tax reduction. In addition, there is a special depreciation allowance for small and medium-sized companies for digitalization-related machinery investments. From 2020 to 2022, the effects of these tax incentives will weaken, and therefore the average annual growth rate will be around 5%.

[63] VDMA International Business Outlook July 2019